

MOTOR AGE

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Three dollars a year
Ten cents a copy



The illustration depicts a vintage Maxwell car on a city street, surrounded by a crowd of people. A large sign on the car's rear reads "22022 MILES". In the background, a large building is visible. A large, stylized advertisement for Champion spark plugs is superimposed on the right side of the illustration. The advertisement text reads: "All Hail To The Maxwell! holder of the present world's record non Stop Run of 22,022 Miles. And the spark plug used,-- Yes, the same set gave their usual unfailing service during the entire run, for of course they used the same make of plugs as are used on all Maxwell cars." Below this text is the Champion logo, which includes a circular emblem with the word "CHAMPION" and the word "Champion" in a large, bold font. The logo also features the words "TOLEDO" and "TRADE" in smaller text.

All Hail To The
Maxwell!
holder of the present world's record
non Stop Run of 22,022 Miles.
And the spark plug used,--
Yes, the same set gave their usual
unfailing service during the entire run,
for of course they used the same make
of plugs as are used on all Maxwell cars.

Champion
TOLEDO TRADE

22022
MILES



Suggestion No. 20

Stewart Vacuum System

\$ 10

Cuts Gasoline Cost

IF you want to get a motorist's attention nowadays *tell* him a sure way to overcome all gasoline troubles including present high prices.

If you want to get his thanks, and his trade *sell* him a Stewart Vacuum System for \$10-complete.

It's the one answer to every gasoline question.

"No car is better than its accessories"

The Stewart-Warner Speedometer Corp.
Chicago, Illinois, U. S. A.



MOTOR AGE

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ANNOUNCEMENTS

"A Road System, Par Excellence," which will be the feature of Motor Age for June 8, will detail what Washington has done to give tourists a net work of good roads. The intermontaine trails take one through many scenic grandeurs, the Evergreen state having much in the way of scenery that is different for those who tour and feast on the beauties of Nature.

June Ushers in Biggest Touring Season in Motoring History

Touring motorists need special equipment, the lack of which has not been so noticeable in simply driving "round home."

These touring motorists need shock absorbers for comfort on country roads—power tire pumps for punctures and blowouts that come miles from a "free air" garage—extra spark plugs—speedometers that check exactly with their Blue Books—extra tires and extra tubes able to stand the gaff—warning signals that guarantee safety on strange roads—tool kits that make roadside repair work easy—lighting and starting systems that make the tour more pleasurable—carburetors that are reliable—auto clocks that tell time—goggles—motoring clothing—and a host of other equipment.

Touring motorists—and the most enthusiastic of them read MOTOR AGE—will give advertised goods the preference. Dealers sell the goods for which there is the demand.

What you have done before has paved the way, but advertising now, and throughout the next four months, will point sales in your direction at buying time.

MOTOR AGE

Mallers Building

Chicago



Opportunities

—one of the best in California

RIGHT on the coast, too, in a city with a population close on to 50,000. The buying power of the people here has always been exceptionally good, and well it might be, for the city ranks eighth in industrial importance, with its value of products rated at five millions of dollars.

Four big railroads run through the city, which also boasts of excellent harbor and shipping facilities. Five ocean steamship lines care for water transportation of lemons, olives, olive oil, raisins and dried fruits, which constitute the bulk of the big export trade carried on by this prosperous seaport.

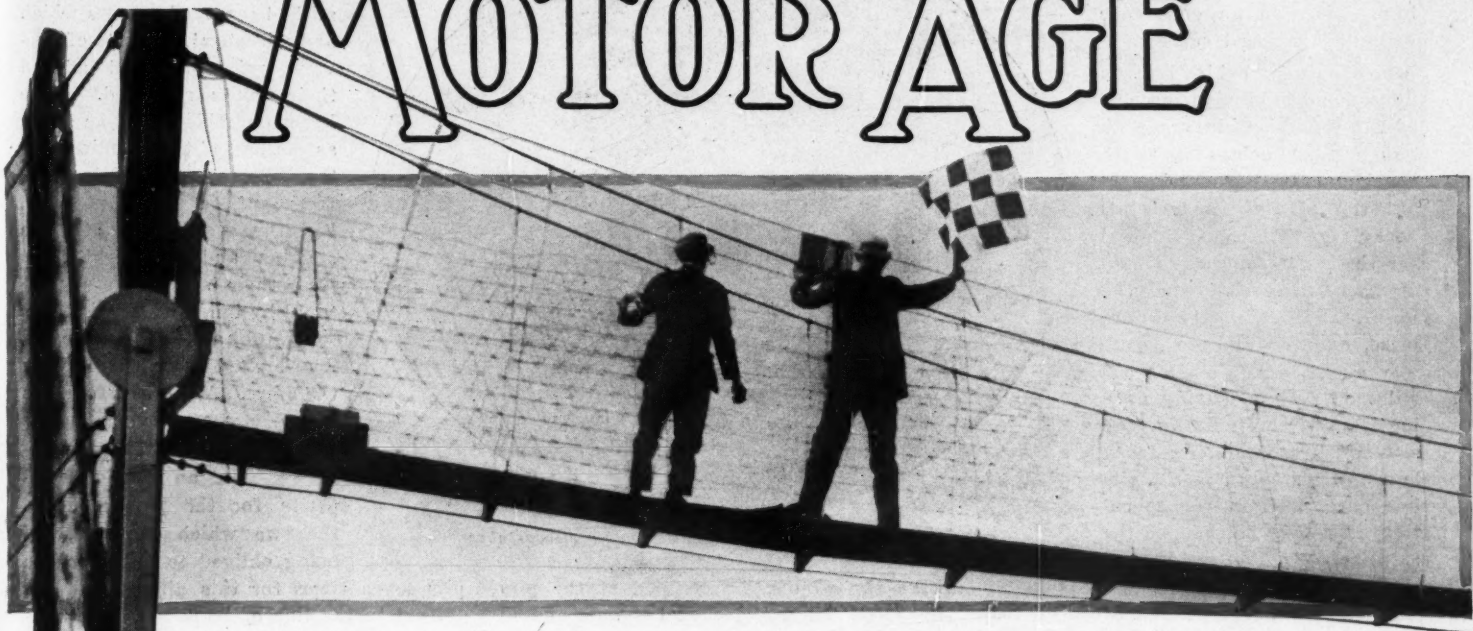
A greater opportunity to establish a Studebaker Agency was never offered in the State. Considering the character of co-operation that the Sales and Service departments of the Studebaker Corporation are ready to give, the successful applicant for this agency ought to build up a good and lasting business within a very short time. Write for details.

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South Bend, Ind. Detroit, Mich. Walkerville, Ont

Address all correspondence to Detroit

MOTOR AGE



Resta's Peugeot First in Hoosier Classic

D'Alene in Duesenberg Second—Italian Not Pushed

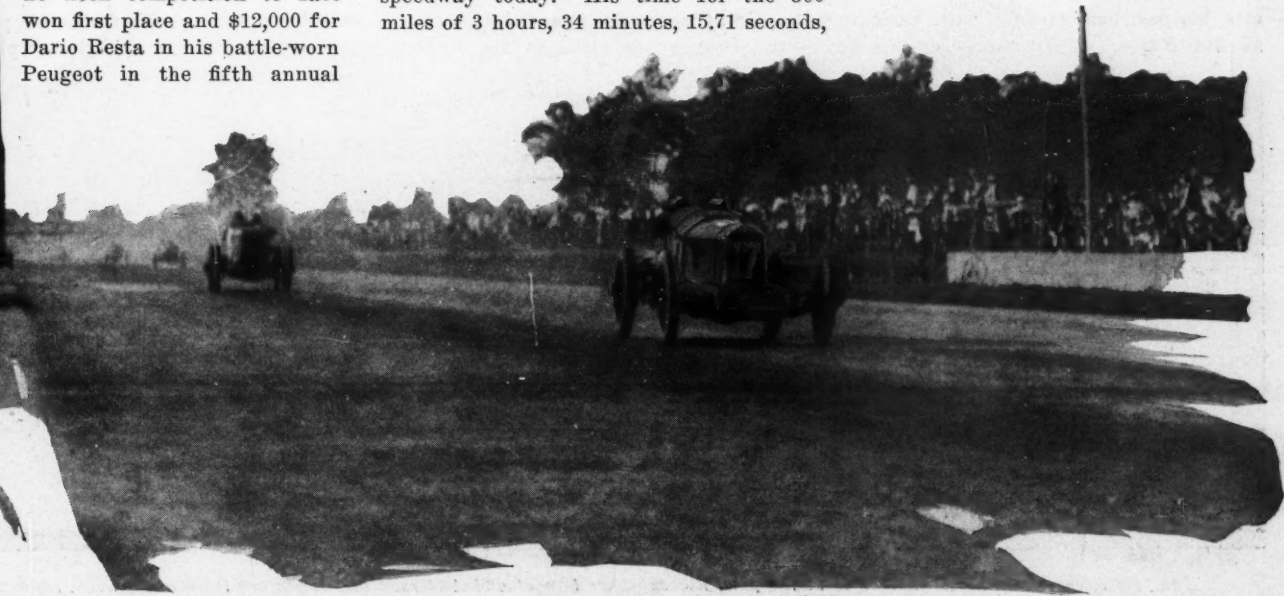
HOW THEY FINISHED AND WHAT THEY GOT						
DRIVER	CAR	TIME			AVERAGE	PRIZE
		HRS.	MIN.	SEC.		
Resta	Peugeot	3	34	15.71	84.05	\$12,000
D'Alene	Duesenberg	3	36	15.28	83.25	6,000
Mulford	Peugeot	3	37	56.20	82.65	3,000
Christiaens	Sunbeam	3	46	36.03	79.45	2,000
Oldfield	Delage	3	47	19.63	79.20	1,700
Henderson	Maxwell	3	49	56.48	78.35	1,400
Wilcox	Premier	3	54	31.31	76.85	1,200
Johnson	Crawford	4	01	54.75	74.45	1,000
Chandler	Crawford	4	03	10.51	74.05	900
Haebe	Ostewig	4	04	47.10	73.30	800

INDIANAPOLIS Motor Speedway, May 30—Consistent plugging with practically no keen competition to face won first place and \$12,000 for Dario Resta in his battle-worn Peugeot in the fifth annual

By Wallace B. Blood

memorial day classic on the Indianapolis speedway today. His time for the 300 miles of 3 hours, 34 minutes, 15.71 seconds,

at an average speed of 84.05 miles an hour did not approach the speed set in last year's race, but there was no de Palma



to set his nerves on edge. The rest of the field did not have enough speed even to trail him. He won an endurance drive, not a speed contest.

Mechanical troubles held an upper hand in eliminating half of the would-be winners, with tire change delays a minor consideration. The triumphant son of Italy opened his pocket for first money for the fourth time in American long-distance races—he won the Vanderbilt cup, the grand prize, and the Chicago speedway event in 1915—after 300 miles of routine driving, rolling lap after lap with the consistency of a barn-bound truck horse. He stopped at the pits but once, that in the seventieth lap, when he changed the right rear tire and replenished the gasoline supply.

Resta was never headed after he took the lead from Aitken in the forty-fifth mile. At the start, Rickenbacher, in the Maxwell, pulled away from the rest of the bunch, but his spurt was short lived, as a connecting rod poked its way through the white speeder's crankcase in the twentieth lap. From the time of Rickenbacher's retirement until the sixtieth lap had been turned, Resta's trailer was a see-saw between Louis Chevrolet in the new and untried Frontenac, D'Alene in his year-old Duesenberg and Johnie Aitken at the wheel of another Peugeot. Ralph Mulford carried his Peugeot into second place at 200 miles, but was passed in the next ten laps by D'Alene, who held a narrow edge on this position until the finish.

D'Alene's Driving a Surprise

Wilbur D'Alene's drive into second position was a surprise and a revelation. He is one of the youngsters of the racing business, and drove a car which had been worn and torn in many previous combats. He won his position in exactly the same way as did Resta, by relentless consistency.



Dario Resta, winner of the sixth Hoosier sweepstakes

Like the winner, he stopped at the pits but once. He was docked 1 minute and 35 seconds for a right rear tire change and new supply of gas and oil.

After an exciting brush with D'Alene, which was one of the real features of the race, Ralph Mulford was outspeeded and dropped back into third position, which he held until the finish. Mulford also made but one pit stop, when he changed his right rear and took on oil and gas.

The fact that the first three cars got the checkered flag within 4 minutes of each other, made the element of chance a strong factor in the last five or ten laps. Had Resta been obliged to stop during this period, the honors probably would have gone to D'Alene or Mulford. The former's time was 3 hours, 36 minutes, 15.28 seconds, at an average of 83.25 miles an hour, and Mulford was flagged a minute and 41 seconds later with an average figure of 82.65 miles an hour.

The race was a battle between the old and the new and at the finish there was not a question as to which was the superior. The first five finishers, Resta in the Peugeot, D'Alene in the Duesenberg,

Mulford in the Peugeot, Christiaens in the Sunbeam, and Oldfield in the roaring Delage, all had seasoned mounts which had withstood the tests of previous trying grills and had had their faults remedied. The Premiers, which were as green as the hue of their bodies, and the Frontenacs, which were fresh out of the paint shop, had the speed without the stamina and the result was that their spurts were punctured by innumerable pit stops for mechanical troubles. Spark plugs were changed by the score. A total of fourteen costly stops were made for this evil alone. The Frontenacs showed an insatiable appetite for the pop-producers, the two which were entered being obliged to pull into the

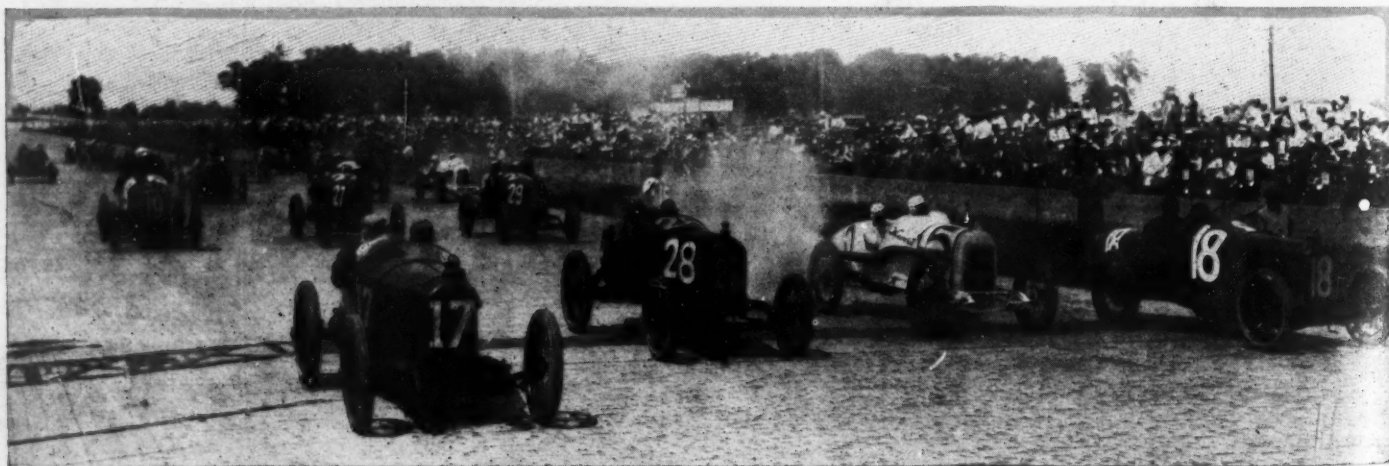
pits seven times for this ailment.

Next in the line of bank account builders came Rickenbacher, in the Maxwell, which Henderson nursed for the first fifty-three laps. The honors for the position should be divided equally between the two drivers. Henderson drove a remarkably consistent race without a pit stop until his more experienced teammate changed seats with him. Rickenbacher pushed the car much harder than had Henderson and the pressure was too much for the fleet white Maxwell. Three stops at the pits spread gloom over the fans who had bet on Rickenbacher to win, two for tire changes and a valuable 5 minutes and 20 seconds spent on repairing a broken oil line. The Maxwell averaged 78.35 miles an hour.

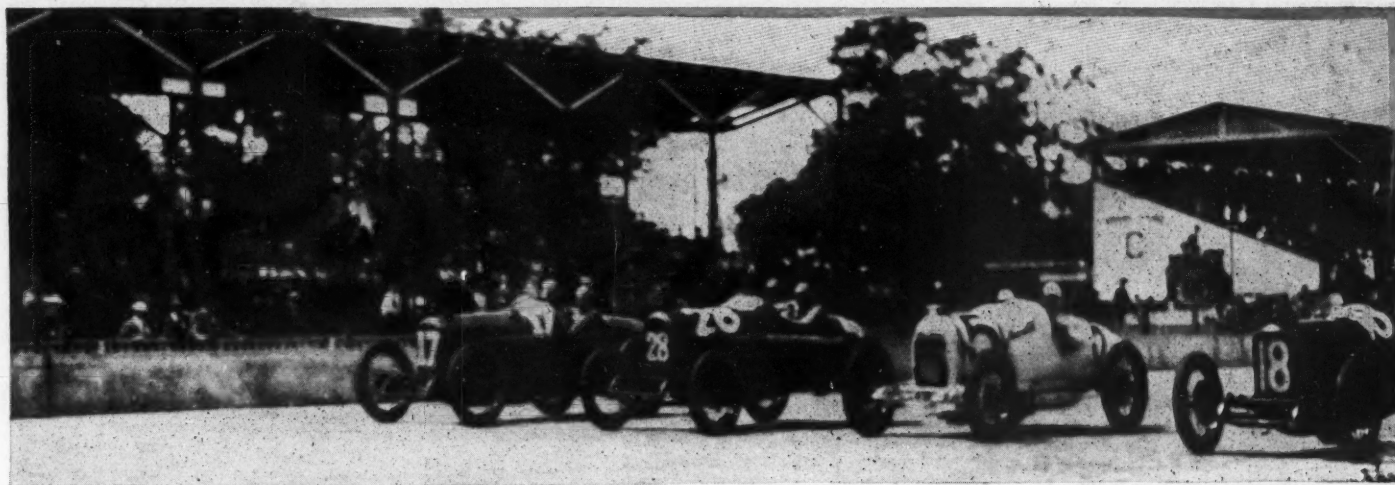
Crawford's Slow But Sturdy

Billy Chandler's creations, the Crawford's, slow in speed but thoroughly sturdy, took eighth and ninth, Johnson and Chandler the respective drivers. The former averaged 74.45 and the latter 74.05 miles an hour.

An \$800 check for tenth place was the reward for Haebe's steady piloting in the



The first tier getting away. Aitken is at the pole, Rickenbacher is next and Anderson and Resta are third and fourth, respectively



Aitken, Rickenbacher, Anderson and Resta in the flying start across the tape

Ostewig special. He averaged 73.30 miles an hour.

Although it was not, from a monetary consideration, as heartbreaking a defeat as de Palma sustained in 1912 when he lost the lead and position in the 500-mile classic by failure of his car in the last lap, the final circuit of Tom Alley, in his Ogren, brought a throb of sympathy from the 80,000 spectators. Running in eighth place in his two-hundred and ninety-seventh mile the diminutive builder-driver limped to the tape on one cylinder and smiled at starter Marmon and the green flag he waved. That one cylinder bore him around his last lap, but not until he had been passed by the yellow Crawfords and the stubby Ostewig of Haebe's. The first official announcement gave Alley tenth place, but a checking of the time records after the race crowded him just out of the money.

Lecain Is Seriously Hurt

Two upsets, both from the same cause, brought serious and possible fatal injuries upon Jack Lecain, who was driving as

while running high on the south turn, skidded in the path of oil and bumped the outer rail with such force that his mechanic, Thane Houser, was thrown over the wall and onto the dirt level beyond. Rooney was caught under the wheel and stayed with the car as it rolled over down the bricks to the inner fence. His right shoulder was dislocated, his right leg broken and he sustained painful bruises.

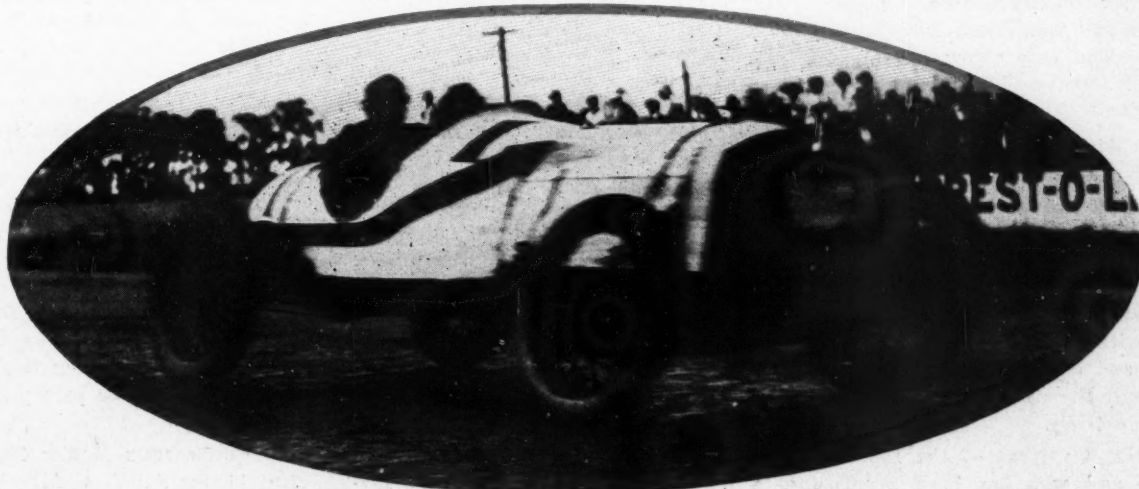
Like his teammate Carl Limberg, who was killed in the recent Sheepshead Bay race, Jack Lecain, the Bostonian, skidded when high up on a turn and bumped the outer guard rail. The easterner hit the oil path on the north turn at too high a rate of speed, whirled a revolution and hit the fence, then rebounded onto the track and turned over. His mechanic escaped with minor bruises, but the driver was pinned under the wreck. His skull was scraped and the scalp cut, one leg was fractured in several places and his spine seriously injured. For a time his life was despaired of, but latest reports give him a chance for recovery.

track and harden up the saturated infield and parking spaces. A crowd estimated at 82,000 people was in the inclosure at the time for the start. It started coming in as soon as the gates were open and the stands were well sprinkled with spectators for the morning try-outs.

Mulford, who was permitted by the judges to postpone his try-out until Monday because of his antipathy for Sunday driving, and who was soaked out from a chance on Monday by the rain, put his car through the paces this morning.

Boyer Qualifies Frontenac

The Frontenac scheduled to be driven by Gaston Chevrolet was brought onto the course at a late hour and after several attempts the brother of Louis, the veteran, failed to round the circuit in the required time. Forthwith Joe Boyer, Detroit millionaire and Frontenac financier, took the wheel and in one lap put the red aluminum creation in the race. By a special dispensation of the officials, Louis Chevrolet, whose own Frontenac was put in the sheds in the morning with

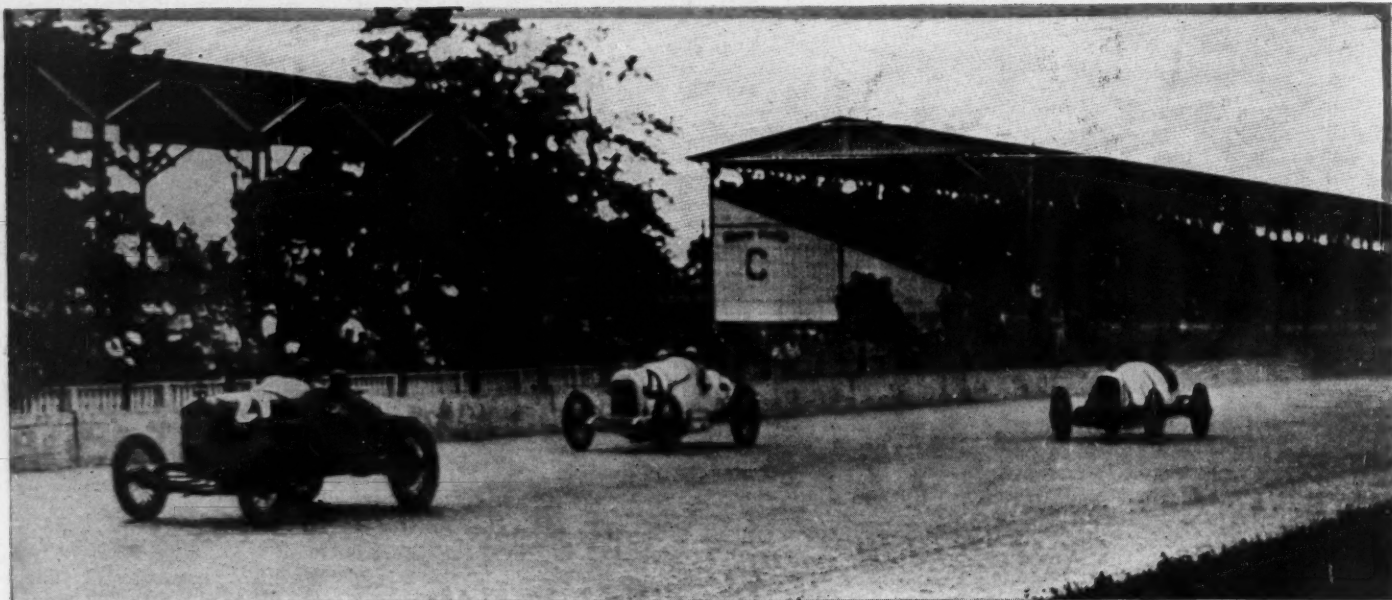


Wilbur D'Alene's Duesenberg brought home second money, \$6,000

relief in De Vigne's Delage, and hurt Tom Rooney, who climbed the top rail in the south turn in his green Premier. Rooney's jinx caught up with him in his forty-eighth lap. He misjudged his speed

After a blue Monday of rain and its accompanying slop and puddles, the day of memory burst forth in cloudless glory. Enough breeze crossed the course throughout the morning to dry thoroughly the

an irreparably cracked cylinder, was permitted to drive his brother's car and, considering the slow speed made in the preliminaries, the showing of the car in the race was commendable.



Rooney, Rickenbacher and D'Alene in a brush in front of the stands

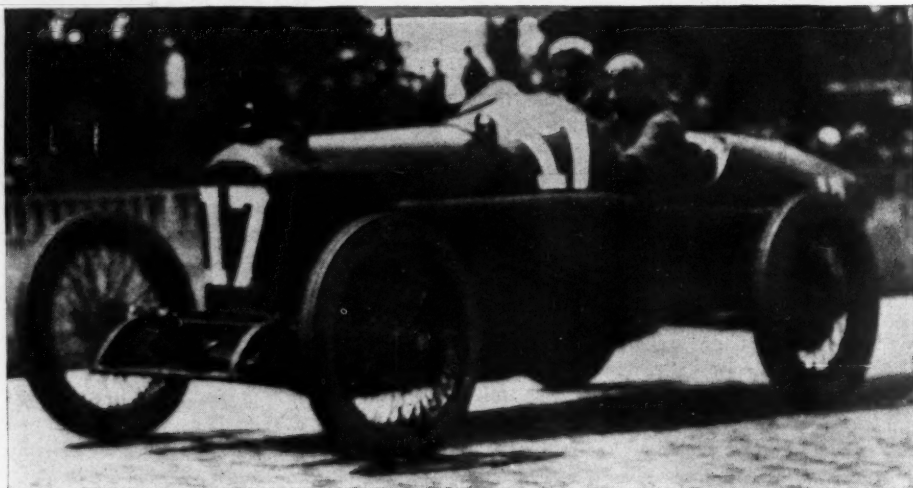
Chevrolet completed the first ten laps in tenth place. Then in another ten round-trips he climbed to seventh. In the thirtieth and fortieth laps he held second place, when mechanical trouble of chronic nature set in and he and his relief driver, Joe Boyer, came into the pits so often that the pitmen got dizzy. The car and its chances finally died on its two hundred and seventh mile, just as Resta finished the race. Arthur Chevrolet ran equally as intermittently, although his car showed speed when on the track. Engine trouble finally conquered him in the forty-second lap.

The three untried Premiers had their share of woe. Tom Rooney was the first out when he turned over. Premier number 28, driven by Gil Anderson, went out in the twenty-fifth lap with a broken oil pipe. Wilcox was obliged to make five pit stops, twice to change spark plugs, twice for gas and water and once for a tire change. The cars showed a great deal of speed but seemed to have difficulty in cooling.

Odds Against Aitken

Johnnie Aitken in the number 18 Peugeot gave promise of putting up a spectacular tete-a-tete with Resta until everlasting tire trouble necessitated four pit stops and finally after another stop and a change of plugs he was retired to the grandstand with a broken valve in his one hundred and seventy-third mile. Aitken gets credit for the fastest time in the elimination trials.

Charlie Merz, a veteran of the Indianapolis track, and who has been a race driver since 1905, ran in fifth place for twenty laps. On his sixty-third mile his brilliant drive was suddenly terminated by internal complications in the motor which failed to respond to drastic treatment in the pits. Franchi, in his hybrid combination of Sunbeam and Peugeot, record was made by the late Boillot, who



Dario Resta and his Peugeot, which carried him to first place

dubbed the Pusun, was the first to drop out. His demise was recorded in the ninth lap and engine trouble was the cause. Dave Lewis' Crawford became zero in prospects in the seventieth lap with a broken gas line as the reason. Eddie O'Donnell's Duesenberg was crossed off the list yesterday. The right rear brake drum was broken in practice.

Barney Oldfield drove with an indifference to speed and the position of his nearest competitors which led one to believe that he was simply concentrating his thoughts on the enjoyable taste of that inevitable cigar instead of trying for a place in the row of money-makers. His steady, heady driving, however, brought him into a comfortable fifth place. The deafening roar of his big Delage shadowed into purrs the exhaust sounds of the other entries. This same Barney, who, the saying is, has driven his last long-distance motor race, broke the lap record for the Indianapolis speedway yesterday in his Christie when he covered the two and one-half mile course at an average speed of 102.62 miles per hour. The previous

was recently killed by German airmen when fighting in France. His time was 1 minute 30.13 seconds. Oldfield covered the course in 1 minute 27.70 seconds.

Exactly at noon a band of two hundred instruments paraded a complete circuit of the course. Their lap time was not taken, but by the perspiration visible on the brows of the brass horn mechanics at the finish, the speed must have been terrific. The drum major was ably assisted by a lad with a 36-inch wheelbase who insisted on keeping step with the grown-ups regardless of the danger of splitting his gears. The cars lined up for the start in accordance with the speed they had made in their qualifying trials, the fastest car receiving the pole position in the first row.

Mechanic Becomes Muffler Clamp

Harold Smith, Tom Alley's mechanic, sacrificed several layers of skin from his right hand when he used it for a muffler pipe clamp, the regular equipment having dropped by the wayside. Alley swung into the pits and the smoking encumbrance was promptly discarded.

The finish of the Ostewig special came

very near being literally its finish. When Haebe was greeted with the checkered flag his enthusiasm overran his good judgment and he waved both hands over his head. The car without the accustomed guidance wandered over the track in front of the grandstand like a lost sheep before the winner of tenth place took the panic out of it.

A feature of the start was the daring performance of C. L. Rouse, mechanic for Johnson, who sprawled himself out over the hood of the Crawford to fasten a hood strap and rode in this position until far around the first turn while the car was turning up a dizzy pace. He was greeted by cheers from the crowd for several laps until the event was forgotten in the excitement of the ensuing speed brushes.

Rickenbacher's Mystery

Prior to the start of the race Rickenbacher set the crowd guessing by keeping the right front steering knuckle of his Maxwell carefully covered with a khaki coat. Sleuths put on the trail finally discovered that the hidden mystery was a blower connected with a hand pump beside the mechanic's seat designed to cool the troublesome outside tire with a current of air exuded from the blower by the efforts of his undersized mechanic, Harry Goetz. Whether Eddie feared the jeers of the drivers or had a patent application in mind is a question.

The performance of the English Sunbeam, driven by Josef Christiaens, the Belgian, was a disappointment to many. Dopesters figured him out to be a strong contender for first place, and in the race he never even put in a bid. It appeared that he had speed in reserve which he never used.

The contest did not have the thrills of previous years. De Palma's average of 90.21 miles an hour for 300 miles and 89.84 for the 500 in the 1915 event

made today's speed showing a disappointment. It was lack of competition, not lack of a fast car, that kept Resta's average low.

Notes of the Race

The Crawfords had the words "Retard Your Spark," printed in big black letters on the front of the radiators as a timely hint to the crankers to perform that operation before turning over the motors. It may have saved a broken wrist, who knows?

Last year Resta won \$10,000 by taking second place. This year his reward for first place was \$12,000, but he worked shorter hours. He received the same amount of money in proportion to the number of miles driven and the relative position in which he placed that he did last year, as the aggregate prize in 1915 was \$50,000 for 500 miles against this year's \$30,000 for 300 miles.

Johnnie Aitken scored a cylinder in his Peugeot in practice the day before the race. Heroic efforts were made to repair the damage done, but the makeshift job was the eventual cause of Aitken's undoing. Exactly the same trouble put Louie Chevrolet's Frontenac in the discard.

The RiChard had the speed to qualify but weighed some odd 1,000 pounds too much to suit the A. A. A. regulations. The judges ruled it out before the race.

The Frontenacs were frequently marooned at the pits. Possibly their color had something to do with it.

Christiaen's Sunbeam was "in the white." The unpainted and lengthy craft from England spat clouds of oil smoke throughout the race, much to the detriment of the riders' complexions.

A Norfolk suit, a cane, low-cut shoes and a pair of horn-rimmed glasses accompanied by Carl Fisher, speedway owner, started a morning pedestrian inspection of the course. One of the low-cut shoes became inopportunistly entangled with the electrical timing wires across the starting line of the course and the havoc wrought was appalling. The above equipment, with the exception of the Norfolk suit and shoes, abandoned the owner with exasperating efficiency and scattered a rod over the bricks. Fisher escaped from the upset with a few minor bruises.

LECAIN HAS CHANCE TO LIVE

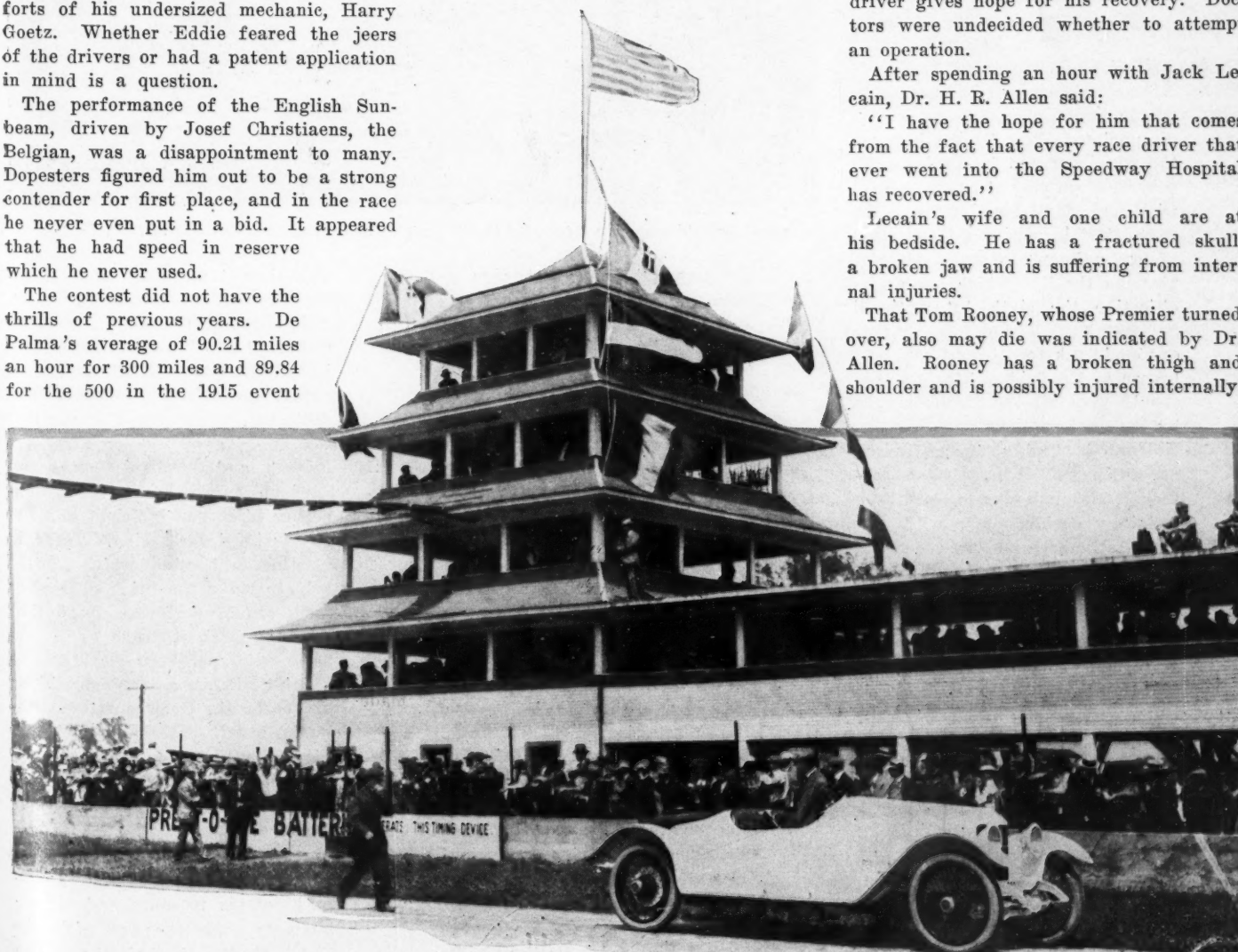
Indianapolis, Ind., May 31—Special telegram—Jack Lecain, who was crushed under his racing car in the 300-mile race yesterday afternoon, has a fighting chance for his life, it was stated at the Methodist hospital at 9 o'clock this morning. The great vitality required of a race driver gives hope for his recovery. Doctors were undecided whether to attempt an operation.

After spending an hour with Jack Lecain, Dr. H. R. Allen said:

"I have the hope for him that comes from the fact that every race driver that ever went into the Speedway Hospital has recovered."

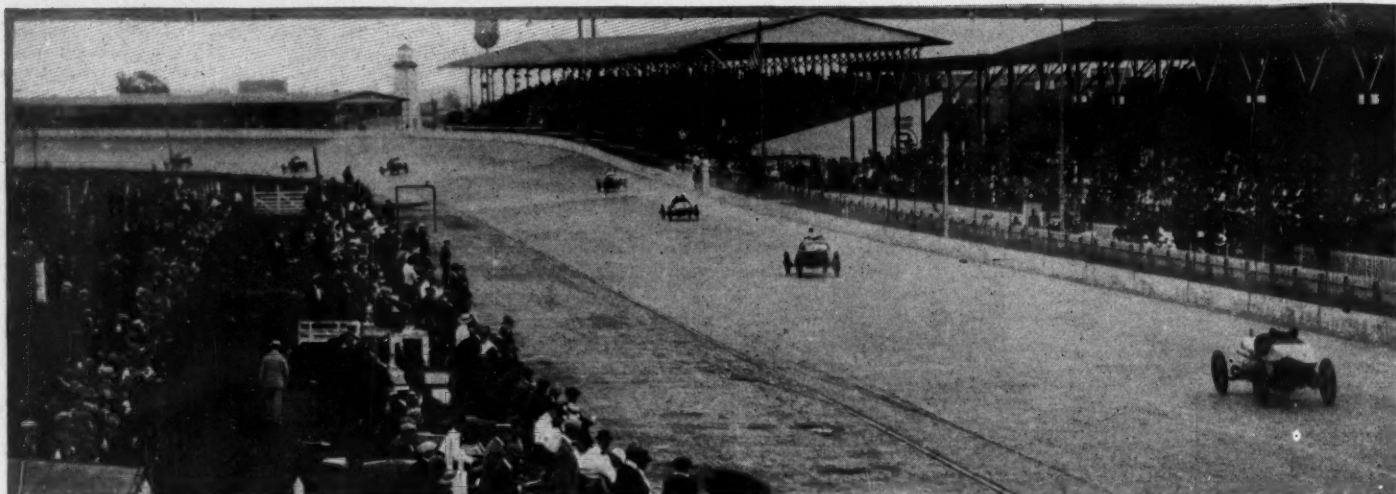
Lecain's wife and one child are at his bedside. He has a fractured skull, a broken jaw and is suffering from internal injuries.

That Tom Rooney, whose Premier turned over, also may die was indicated by Dr. Allen. Rooney has a broken thigh and shoulder and is possibly injured internally.



Press and judges' stand. In the foreground is Frank E. Smith's Premier, which set the pace for one lap

How the Sixth International Sweepstakes Was Run—And Won



They often were bunched as they passed the grandstands and entered the first turn

Story in Miles, Not in Metaphors, Detailing the Movement of the Cars from Start to Finish

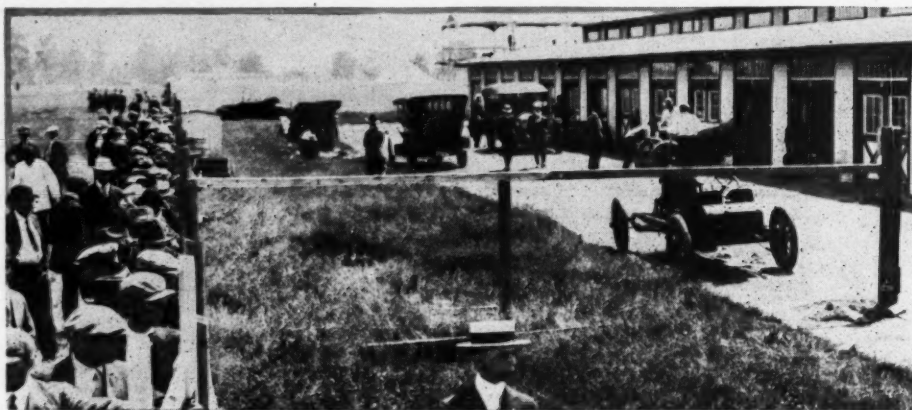
By William K. Gibbs

10:00—INDIANAPOLIS Speedway, May **A. M.** **1:30**—Early risers who sought the awakening of a perfect day are not disappointed. The 4 miles between the speedway and its Indianapolis suburb—for today at least—is lined with cars of all descriptions. The very latest in motive art and some of an unknown vintage vie for place in the line which has as its objective the sixth International Sweepstakes. The day is all that one could ask for—bright sun, cool breeze and a field of starters that should give all the thrills sought by the most captious.

10:30—Mulford is tuning up a Hudson Super-Six and it may be a contender, although this has not been definitely decided as yet. A few cars are limbering up on the track, others are being prepped at the pits, while the most of them are still in the garages, where the drivers and mechanics are going over equipment and giving their mounts the finishing touches.

11:00—Eddie O'Donnell broke a brake drum on his Duesenberg last night and is out of the race. Louis Chevrolet just cracked a cylinder and will not be able to start. The mystery car from Cleveland—Delno's RiChard—is 1,000 pounds over weight and will not be allowed to start. Lecain's Delage is out with a broken crankshaft.

11:30—Gaston Chevrolet has been trying to qualify one of the Frontenac for



The railbirds were interested in the activity about the garages early in the morning

the last half hour but does not seem able to get the requisite speed. Joe Boyer takes the wheel and drives the cigar-shaped maroon car for a circuit of the track and satisfies the timers that the Frontenac is entitled to a place before the starter 2 hours hence. Boyer turns the mount over to Louis Chevrolet, who will drive instead of his brother, Gaston.

12:23—Judges estimate that there are 50,000 in the stands and infield at present and thousands are still coming.

12:35—The cars are lining up at the starting line and the technical committee is testing the gasoline. In the first row are Aitken's Peugeot, Rickenbacher's Maxwell, Anderson's Premier, and Resta's Peugeot. Oldfield's Delage, Wilcox's and Rooney's Premiers and Merz's Peugeot are lined up in the second tier. In the third tier Henderson's Maxwell is at the pole and D'Alene's Duesenberg and Arthur Chevrolet's Frontenac are next in the order named. DeVigne's Delage, Haibe's Osteweg Special,

Christiaens' Sunbeam and Chandler's Crawford are in the fourth tier; Franchi's Pusun, Johnson's Crawford and Lewis' Crawford are in the fifth row and Alley's Ogren, Louis Chevrolet's Frontenac and Mulford's Peugeot are in the last row.

1:10—Drivers and mechanics are now lined up before the official photographer. The sun is bright and the day is ideal for racing. There is a stiff west wind which should help to make the brick oval very fast. From performances during the last week it looks as if the 89.84 miles per hour mark set by Ralph de Palma a year ago will be broken on the Hoosier course within the next 4 or 5 hours, although the Italian drove five centuries instead of three. It is estimated that when the race starts there will be 83,000 spectators.

1:28—They're off! On a lap paced by Frank Smith. Art Johnson's Crawford refuses to start and his attendants push the car with the clutch thrown in until the engine starts. Rouse, Johnson's mechanic,



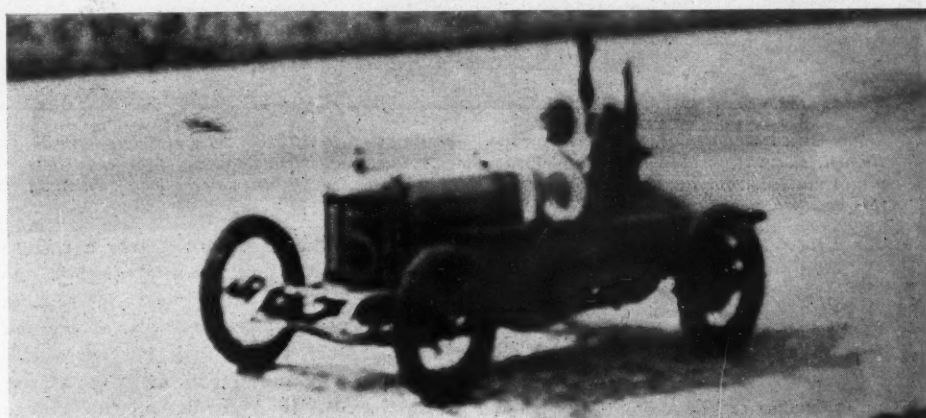
furnishes a thrill by lying over the top of the hood to fasten hood strap as the yellow machine dashes into the first turn.

1:30—The race is on. Johnson is half a lap behind when the leaders cross the tape. The spurt at the getaway brought rousing cheers from the stands.

1.32—Rickenbacher is well in the lead at the end of the first lap. Aitken and Resta are crowding him however. Rickenbacher is nearly a quarter of a lap ahead of Aitken and Resta, who are fighting for second place.

1:38—Wilcox stops at the pits with engine trouble.

1:40—Rickenbacher has lapped both Johnson and Franchi and the latter has

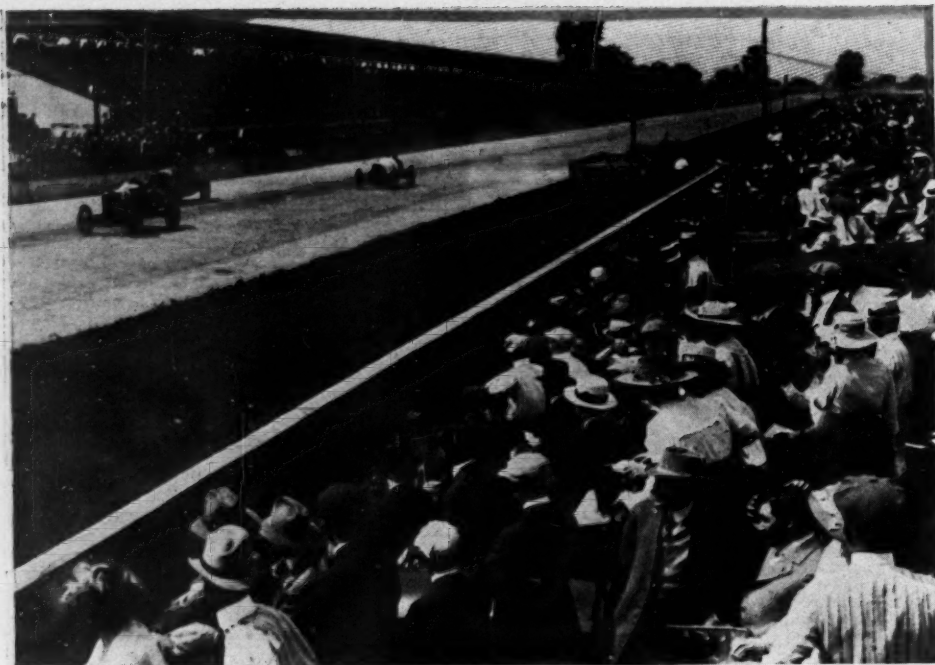


been lapped by both Aitken and Resta who are still fighting for second place, the first three being

nearly half a lap ahead of the field. Resta and Aitken are driving consistently but do not change places.

Elapsed Time at End of Each Ten Laps of the Indianapolis 300-Mile Race, May 30, 1916

[illegible]



The crowd along the safety zones had to have its attention frequently called by the militiamen, else they would have rushed the fence. Those with coveted front row positions would not leave for a moment, for the others, like water, sought the lowest level, which in this case was tight against the wire fence

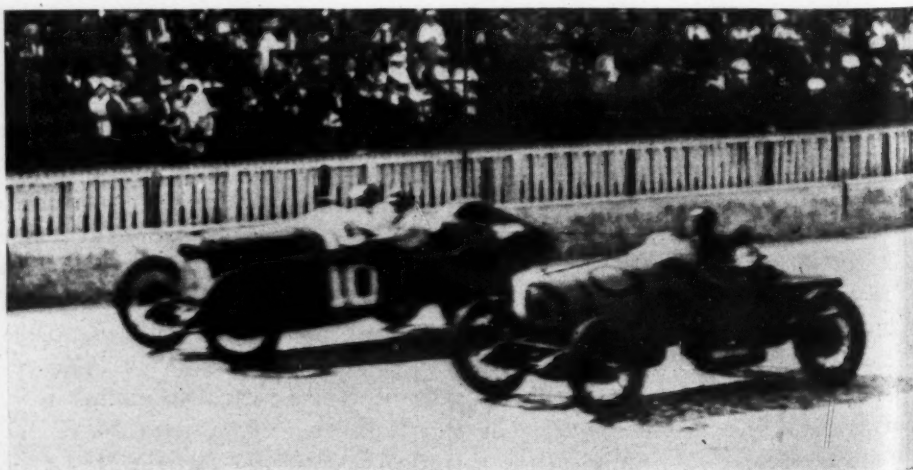
- 1:45—Wilcox gets away from the pits as Johnson pulls in. The time for the first 10 miles is 6:35.6, an average of 91 miles per hour.
- 1:48—Oldfield stops at the pit for a right rear tire and is followed by Rickenbacher, while Aitken jumps into the lead. Resta is second.
- 1:54—Billy Chandler stops at the pits. Rickenbacher is still in. There does not seem to be much difficulty so far with tires, most of the stops, in fact all except Oldfield's, having been for some mechanical trouble. Announcer says Rickenbacher has broken his crankcase and is forced out of the race. Chandler stops at the pits again. The Crawford's do not seem to be running right.
- 2:00—Gil Anderson stops at the pits; mechanical trouble. Aitken and Resta have finished seventeen laps. Christiaens comes into the pits for a right rear tire. Franchi's Pusun is out of the race. Johnson stops at the pits.
- 2:03—Resta takes the lead when Aitken comes in for a right rear tire. Aitken gets away in 1 minute. Wilcox stops at the pits again. Johnson also pulls in. He stops nearly every lap. At the end of fortieth mile Resta is leading, Aitken is second, Henderson in the Maxwell, third, and Merz's Peugeot fourth.
- 2:05—Resta has finished his fiftieth mile. Aitken is gaining on Resta and bids fair to wrest the lead from the wily English-Italian within the next 50 miles, if his car holds together.
- 2:10—Christiaens stops at pits for right front tire. Resta now leads the

field with Aitken nearly a minute behind him. Resta's speed at the end of 50 miles was 88.14 m. p. h.

- 2:15—Aitken stops at the pits at the end of the twenty-fifth lap for a left rear tire and gets away in 29 seconds, the crowds in the stands cheering lustily.
- 2:16—Resta has finished the sixtieth mile, his speed being 87.64. Merz brings his Peugeot to the pits for a right rear tire. Also raises hood. Rooney changes spark plugs and is back on the track. Lewis brings his Crawford to the pits; more engine trouble.
- 2:21—Resta, Henderson, D'Alene, Louis Chevrolet, Haibe, Mulford and Alley have not stopped at the pits yet, but all the others have. Resta is on his seventy-fifth mile.
- 2:26—Merz is out of the race. Resta leads at 75 miles, his speed being

87.01 m. p. h. His average is dropping slightly as the distance covered increases. Three cars, Merz's Peugeot, Rickenbacher's Maxwell and Franchi's Pusun, are out of the race. Aitken is second, Louis Chevrolet third, D'Alene fourth and Henderson fifth; time 51:43. At the end of the eightieth mile Resta's time was 65 minutes 14.17 seconds.

- 2:36—Arthur Chevrolet starts again after 15 minutes' delay with engine trouble. The time for 90 miles is 1 hour, 2 minutes, 13.35 seconds; average, 86.78. Still the average mileage drops, Resta being 3 miles behind the average set by de Palma in his Mercedes last year. The order at 90 miles is Resta, Aitken, D'Alene, Louis Chevrolet, Henderson and Mulford. Alley makes his first stop, his mechanic carrying the exhaust pipe in his arms as the Ogren rolls up to the pits. The time for 100 miles is 1 hour, 9 minutes, 14.57 seconds. Arthur Chevrolet stops at the pits again. The average for 100 miles is 86.86 miles per hour, while last year's average was 88.88 for the first century.
- 2:45—Oldfield and Louis Chevrolet stop at the pits, the latter for the first time. Oldfield's stop was for a right rear tire, oil and gas.
- 2:53—Billy Chandler stops at the pits. At the end of 110 miles the positions were: Resta first, D'Alene second, Aitken third, Mulford fourth and Henderson fifth. Louis Chevrolet stops again. Resta's time for 120 miles is 1:23:00.4.
- 3:00—Aitken stops at the pits for a right rear tire. Takes on gas. Resta leads at 125 miles; time 1:26:28. Average, 86.78. All but five cars—D'Alene's Duesenberg, Henderson's Maxwell, Haibe's Osteweg Special, Mulford's Peugeot and Resta's Peugeot—have made stops at the pits. At the end of 125



Mulford's Peugeot passes Haibe's Osteweg Special in front of the stands

miles the leaders were: Resta, Aitken, D'Alene, Henderson and Mulford.

3:06—D'Alene stops at the pits for right rear tire. Henderson is relieved by Rickenbacher.

3:10—Rooney's Premier turns over on the south end of the track. His car struck the outer wall, threw the mechanic, Thane Houser, out and the car rolled back down the bank with Rooney in it. Rooney is taken from the wreck with a dislocated shoulder, a broken thigh and cuts and bruises. Alley comes into the pits with a nude right front wheel.

3:20—At the end of 150 miles Resta leads his time being 2:43:45; average 86:89 miles per hour. He is averaging a little higher.

3:22—Aitken and Resta rush in front of the stands. There is a lap between them in Resta's favor. Rickenbacher is giving his Maxwell all it will take. Haibe stops at pits for first time. He has finished his fifty-eighth lap. Alley stops for a tire. Johnson brings his Crawford to the pits again. Aitken is giving Resta a hard run.

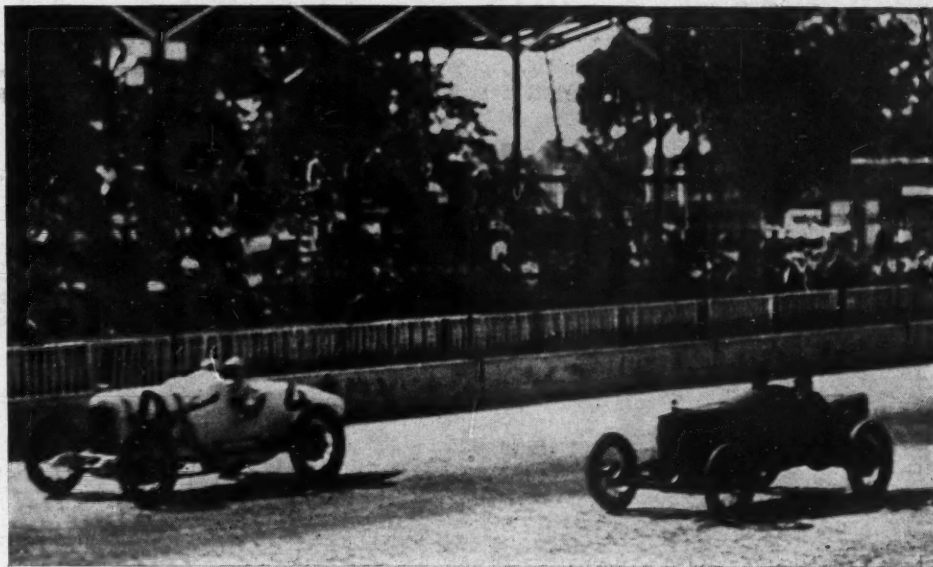
3:27—Aitken stops for two rear tires and makes a change in 25 seconds. Resta stops for right rear tire, oil and gas. Lecain, who went in to relieve DeVigne, has turned over on the north turn.

3:30—Resta gets away. Aitken still at pits.

3:35—Aitken gets away as Resta passes on next round.

3:36—Lecain sustained injuries to head, face, abdomen and back. Mechanician, Charles Bellacchio, unhurt. At 175 miles Resta leads, his average being 86.89 miles per hour. Aitken and Arthur Chevrolet are at the pits. Aitken is out with broken valve.

3:40—Resta finishes seventy-fourth lap. Rickenbacher and D'Alene are next for place. Rickenbacher stops at



Henderson's white Maxwell walks away from Billy Chandler's Crawford in front of the paddock boxes

pits for right rear tire. Mulford makes first stop at pits for right rear tire. He has finished his seventy-second lap. He gets away in 20 seconds.

3:45—Louis Chevrolet changes with Joe Boyer. Oldfield stops for left rear tire, water, gas and oil. At the end of 180 miles Resta leads, his time being 2:14:26:15. Mulford is second.

3:55—Anderson's Premier is out with a broken oil line. After finishing seventy-five laps Boyer and Wilcox stop at pits.

3:56—Twelve cars only are running, ten having dropped out. Those still in are Resta, Boyer, Chandler, Alley, Wilcox, Mulford, Rickenbacher, D'Alene, Haibe, Lewis, Oldfield, Johnson and Christiaens.

4:00—At 200 miles Resta's average was 85.79.

4:02—Rickenbacher stops at pit, mechanical trouble. Resta leads Mulford by 5 minutes. Lewis' Crawford out of race with broken gasoline line.

4:15—At the end of 210 miles the five in the front are Resta, Mulford, D'Alene, Christiaens and Rickenbacher.

4:24—Rickenbacher stops at pits with broken oil line. Resta has finished his 245th mile. At 240 miles his time was 2:49:36.45, average, 84.90. His average continues to fall. Haibe stops at pits. Mulford is second. His time for 240 miles was 2:54:53.6. He is about 5 minutes behind Resta.

4:30—Haibe stops at pits again. Resta has nineteen laps to go. He looks like an easy winner and he is fighting hard to ward off a defeat such as de Palma gave him a year ago. Mulford should finish second and D'Alene third. Rickenbacher back in the race again.

4:33—Resta's time at 250 miles was 2:57:08.04, average 84.68. Boyer stops at pits. Johnson stops at the pits on the nineteenth lap. D'Alene has moved up into second place. Mulford drops to third. Resta's lead at 260 miles was 4 minutes and 15 seconds. D'Alene's time at 250 miles, was 3 hours, 4 minutes, 7 seconds. Lecain's condition improving. Christiaens is in fourth place. Gil Anderson is at the wheel of Wilcox's Premier.

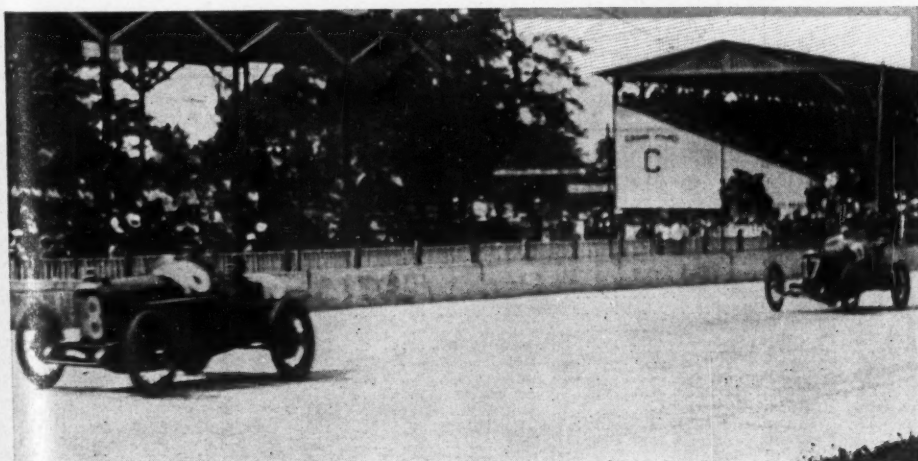
4:48—Oldfield stops for a right front tire. Haibe also stops. Resta's time for 275 miles was 3:16:30.95.

5:00—Anderson stops at pits. Resta seems confident of winning and is slowing up, evidently saving his car. D'Alene and Mulford are putting up a pretty battle for second place.

5:02—Resta gets green flag.

5:04.17—Resta wins. Time 3:34:17.51; speed, 84.05 m. p. h.

5:06:15.2—D'Alene, second; time 3:36:15.28; speed 83.25 m. p. h.



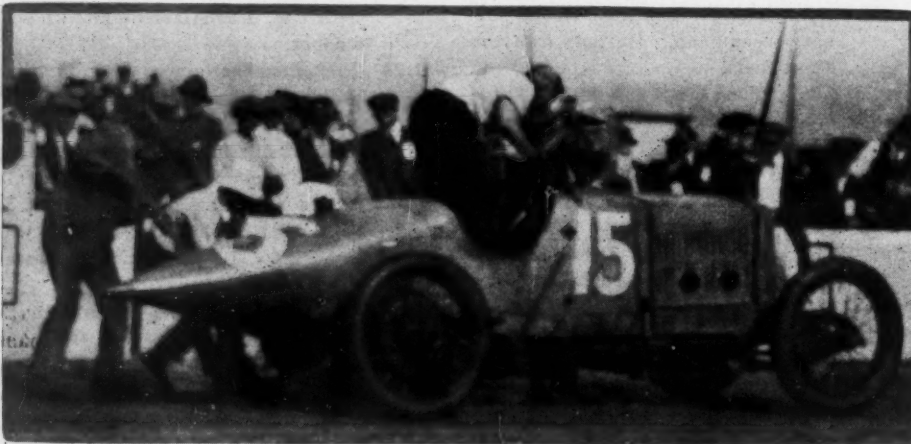
Johnny Aitken led Resta a merry chase during the early part of the race, but the pace set was too much for the former's car, and it was out with a broken valve

New and Green Cars Make Much Pit Work

No Non-Stop Runs in Indianapolis Memorial Day Event—Speed Reaps Harvest of Spark Plugs



Rapid pit work at the Peugeot pit during Resta's only stop. He changed a wheel and refilled the fuel tank



Oldfield changes wheel on the Delage in 23 seconds. This is very close to a record for a tire change

By Darwin S. Hatch

INDIANAPOLIS MOTOR SPEEDWAY, May 30—If one were to judge by the showing that the cars made at Indianapolis today as compared with a year ago, one would be forced to believe that the special speed creations which are to be campaigned this year are no better than those of last year. Not only was the average speed slower for the shorter distance this year, but mechanical difficulties were as numerous, if not more numerous and serious, than they were in the last 500-mile race on the Hoosier oval.

It is true that there were fewer stops at the pits in today's race than there were a year ago, and that there were fewer stops per car, but the race was only 60 per cent of the distance of the last 500-mile sweepstakes, whereas the stops per car were 75 per cent as great as those of a year ago. It is safe to assume that if there were another 200 miles added to today's distance, the ratio of calls at the pits would have been some-

what greater than that of the 1915 race.

Also, it is a certainty that there would not have been eleven cars finished as there were 1 year ago, had today's field been compelled to complete 500 miles be-

fore receiving the checkered flag. As it was, there were only eleven cars to finish today and it is beyond the pale of probability that Tom Alley could have kept his one cylinder going for an additional double century.

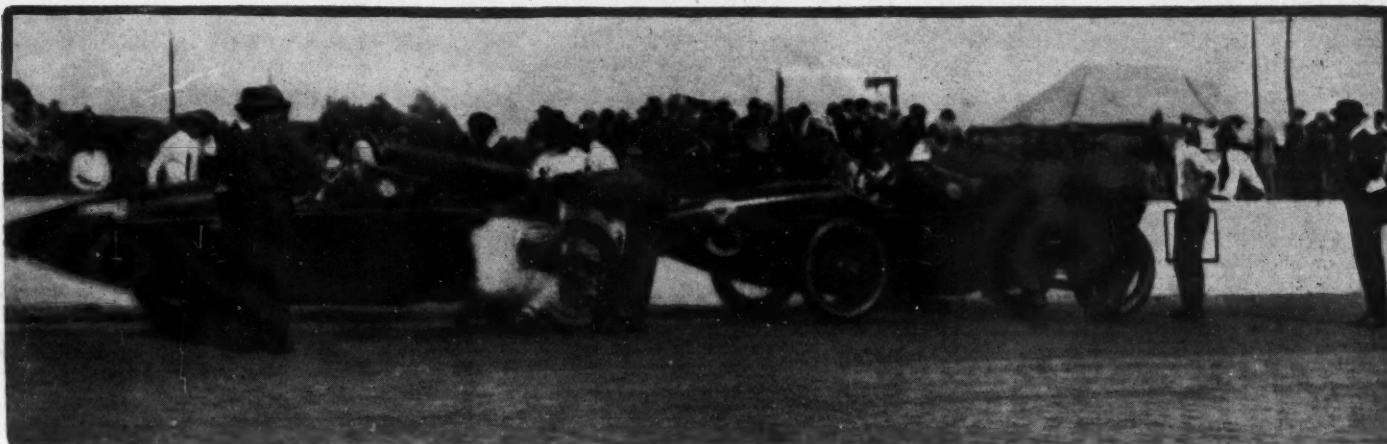
Resta, D'Alene, Mulford, Christiaens and Oldfield in all probability could have completed 500 miles without losing a great amount of time at the pits, but the rest of the field today experienced mechanical difficulties before the finish of the 300 miles.

Of the twenty-one cars which followed out the pacemaker of the preliminary lap to the flying start, five went through the race without lifting the hood, just as a year ago five of the twenty-four starters completed the 500 miles without mechanical difficulties. It is worthy of note that the first five were the only cars which completed the 300 miles this year without having unbuckled the hood straps or tinkered with the running gears. In this roll of honor were Resta's Peugeot,

Motor Sizes and Equipment of Cars Starting in

Car No.	Car	Driver	Piston Disp.	Bore and Stroke	Carb.
17	Peugeot	Dario Resta	274	3.62x6.65	Miller
1	Duesenberg Special	W. D'Alene	299	3.75x6.75	Miller
10	Peugeot	R. Mulford	274	3.6 x6.7	Zenith
14	Sunbeam	J. Christiaens	299	3.18x5.90	Miller
15	Delage	B. Oldfield	275	3.72x6.30	Miller
4	Maxwell Special	G. Henderson	298	3.75x6.75	Miller
29	Premier Special	Wilcox	274	3.6 x6.7	Zenith
26	Crawford Special	A. Johnson	298	3.75x6.75	Miller
24	Crawford Special	B. Chandler	298	3.75x6.75	Miller
9	Ostewig Special	O. Haibe	296	4.34x5.0	Miller
12	Ogren Special	T. Alley	299	3.98x6.0	Miller
8	Frontenac Special	G. Chevrolet	300	3.87x6.37	Zenith
28	Premier Special	G. Anderson	274	3.6 x6.7	Zenith
25	Crawford Special	D. Lewis	298	3.75x6.75	Miller
18	Peugeot	J. Aitken	274	3.6 x6.7	Miller
21	Delage	J. De Vigne	274	3.7 x6.29	Claudel
27	Premier Special	T. Rooney	274	3.6 x6.7	Zenith
17	Frontenac Special	A. Chevrolet	300	3.87x6.37	Zenith
19	Peugeot	C. Merz	274	3.6 x6.7	Miller
5	Maxwell Special	E. Rickenbacher	298	3.75x6.75	Miller
23	Pusun	A. Franchi	299	3.18x5.90	Miller

Bosch magnetos and Dixon graphite were used by all starters.

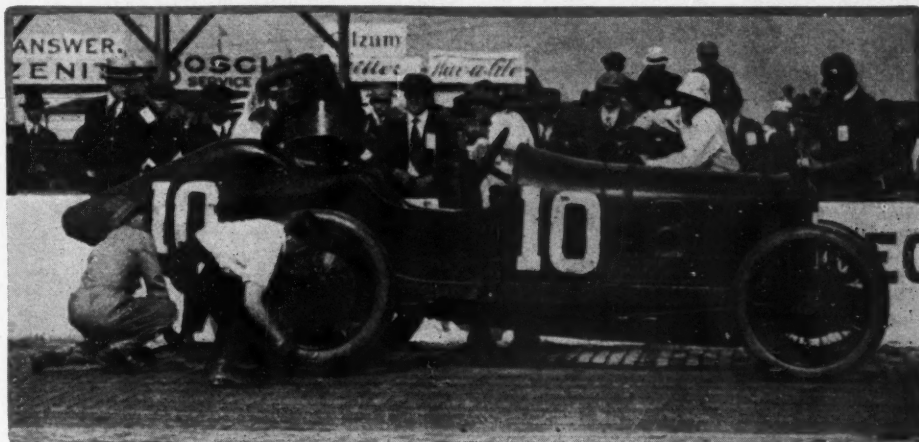


The Frontenacs were marooned at the pits a large proportion of the time. Over-copious lubrication of the aluminum motors fouled spark plugs frequently

D'Alene's Duesenberg, Mulford's Peugeot, Christiaen's Sunbeam, and Oldfield's Delage.

The track was cool, the race was short, the pace was slow, yet not a driver equaled Tom Alley's record of last year by going through without a change of tire. In the 300 miles of today's event the twenty-one starters made a total of seventy-three stops at the pits, exclusive of those which ended in the complete withdrawal of the car. This makes an average of three and one-half stops this year as against four stops per car for the 60 per cent greater distance in the last 500-mile race. By the eleven finishers there were thirty-one stops at the pits, slightly less than three stops per car. This does not compare very favorably with the four stops per car averaged for the Indianapolis race a year ago with its greater distance.

If, however, we look into the entry list more closely, we will find that this pessimistic view which might be gained from the comparison of the two races at Indianapolis is likely to be proven an erroneous one. In fact, in spite of the rather disappointingly large number of mechanical difficulties today, many of the cars probably will make a very much bet-



Mulford preparing for final dash by changing tire and taking on fuel. This stop cost Mulford second place

ter showing in later events. There was an unusually large number of green cars among the starters in this race. Of the twenty-one starters, there were nine which had never faced a starter's flag before. None of them had been completed more than a few weeks and some had hardly had time to get thoroughly warmed up before the starting bomb sounded.

The Premiers were just as green as they were painted and the one which Wilcox

tooled into seventh place had been run only a few miles before it lined up at the start. The fact that it finished at all may be considered a very good record and one not to be expected as a general thing. It showed very good design and workmanship that it could be put together in what must have been considerable of a rush and taken through the 300 miles successfully.

Equally enthusiastic may we be over the future of the Crawford team. Chandler's team of three cars managed to place two in the money and both of them were so new that the paint had hardly dried on their bodies.

The Chevrolet Brothers' outfit of Frontenacs, while they did not get in the money and had a disheartening number of spark plug changes and some other difficulties, probably need only working out to bring them into good shape to finish in the money in later events.

The Ostewig is quite a new car and had not had sufficient working out to bring its speed up to what it possibly will have later. Nevertheless, it showed great consistency, and only made four stops and only one of these was for mechanical troubles, this a minor one due to a loose exhaust pipe.

Resta made only one stop before he

Indianapolis 300-Mile Race, May 30, 1916

Spark Plugs	No. of Valves	Lub.	Wheels	Tires	Front Tires	Rear Tires	W.B.
K. L. G.	16	Oilzum	R-W	Silvertown	34x4½	35x5	106
Rajah	8	Oilzum	R-W	Silvertown	32x4½	33x5	106
Rajah	16	Oilzum	R-W	Silvertown	34x4½	35x5	110
	24	Mix	R-W	Firestone	35x5	35x5	113
Rajah	16	Oilzum	R-W	Firestone	35x5	35x5	104
Rajah	16	Oilzum	Houk	Silvertown	34x4½	35x5	106
K. L. G.	16	Castor	R-W	Silvertown	32x4½	35x5	105
Rajah	16	Oilzum	R-W	Silvertown	32x4½	34x4½	106
Rajah	16	Oilzum	R-W	Nassau	32x4½	34x4½	106
Answer	16	Castor	Houk	Silvertown	32x4½	33x5	102
Rajah	8	Castor	Houk	Nassau	33x4½	34x5	106
Rajah	16	Monogram	R-W	Silvertown	33x4½	33x4½	104
K. L. G.	16	Oilzum	R-W	Silvertown	32x4½	35x5	105
Rajah	16	Oilzum	R-W	Silvertown	32x4½	34x4½	106
K. L. G.	16	Oilzum	R-W	Silvertown	34x4½	35x5	106
K. L. G.	16	Castor	R-W	Silvertown	33x4½	33x5	106
K. L. G.	16	Oilzum	R-W	Silvertown	32x4½	35x5	105
K. L. G.	16	Monogram	R-W	Silvertown	33x4½	33x4½	104
K. L. G.	16	Oilzum	R-W	Silvertown	34x4½	35x5	106
K. L. G.	16	Oilzum	R-W	Silvertown	34x4½	35x5	106
K. L. G.	16	Castor	R-W	Silvertown	34x4	35x5	106

finished a winner. This was after he had gone 175 miles, when he changed a right rear tire and took on gasoline. This seemed more a matter of precaution than of necessity, so that he would be in shape to go through the remainder of the race without a halt.

D'Alene likewise made but one stop and this after he had gone 130 miles. He also took on supplies and changed a right rear tire, getting away in 1 minute 35 seconds.

Mulford got into third place more by consistent running than speed. He prepared for his final dash by changing a right rear tire and taking on gasoline after he had gone 147 miles. His stop was one of the short ones, as he was away in 33 seconds.

Christiaens stopped twice, once to change a left rear tire and again to change the right rear tire. In each case he was held only $\frac{1}{2}$ minute. Oldfield made four stops, practically all of them necessitated by tire changes, although he took on supplies in two of his halts. His last stop was nearly a record tire change, as he was held only 23 seconds in replacing a right front tire.

Details of Ostewig

The Ostewig car, which finished ninth, was not described with the other entries last week. It is fitted with a Wisconsin powerplant that has been developed very much along the line of the Delage.

The engine is a four-cylinder sixteen-valve design having a bore of 4.34 and a stroke of 5 inches. The cylinder casting is vertical and the valves are carried on each side, operating horizontally. The motor, as far as the camshaft layout is concerned, is the same as a T-head job, as there are two shafts, one located on each side of the crankshaft. The camshafts are driven off the timing set at the front end of the motor.

The cams actuate long vertical push rods, four of which are located on each side of the motor. Each push rod operates two



Ralph Mulford handles his car with gloves. His hands are protected even when putting the final touches on his motor just before the start of the race

Rickenbacherisms

Boost the driver as much as the car he drives and attendance at speedway meets will be greater.

Extend every courtesy to the fans for the public foots the bills.

Patriotic spirit born of American supremacy in racing is something we must nurse.

Look after the physical comforts of those attending races and make it equally as easy to reach the track as it is the city where the race is held.

Less than 50 per cent of the speedways have proper facilities for taking the fans from the city to the track.

Hotel rates should not be raised on race days for the influx of people is an advertisement for the city that will bear commercial fruit unless the welcome is too costly.

Three veteran drivers should be appointed at each meet to look over the course not less than 5 days before the race and pass on its safety.

Checking of cars should be done by a trained force of checkers, under the direction of the Speedway Association or the A. A. A.

Arrangements should be made to allow the carrying of the same number on racing cars through the season.

valves simultaneously. The push rods on the right take care of the intake and those of the left the exhaust. The rods bear against Y-shaped rocker arms which are so curved as to transform the motion given to them in a vertical direction by the push rods to a horizontal motion. The vertical rods bear against the stems of the Y and at the end of each of the branches there is a bearing against the end of the valve stem. Thus each rocker arm takes care of the two intake or two exhaust valves for one cylinder.

As a whole, the pit work was only fair, although there were two or three shining examples of good pit management and well-drilled teams. There was no hint of accident at the pits and the J-M fire extinguishers, which were on hand to put out blazes under the hoods, had no opportunity to show their ability as they had at Sheepshead Bay.

There was an excessive amount of spark plug changes. Most of these were due to heating through green motors, improper oiling, etc., but one is forced to wonder whether the dearth of spark plug materials on account of the European war might not have something to do with the short life of the plugs in some instances.

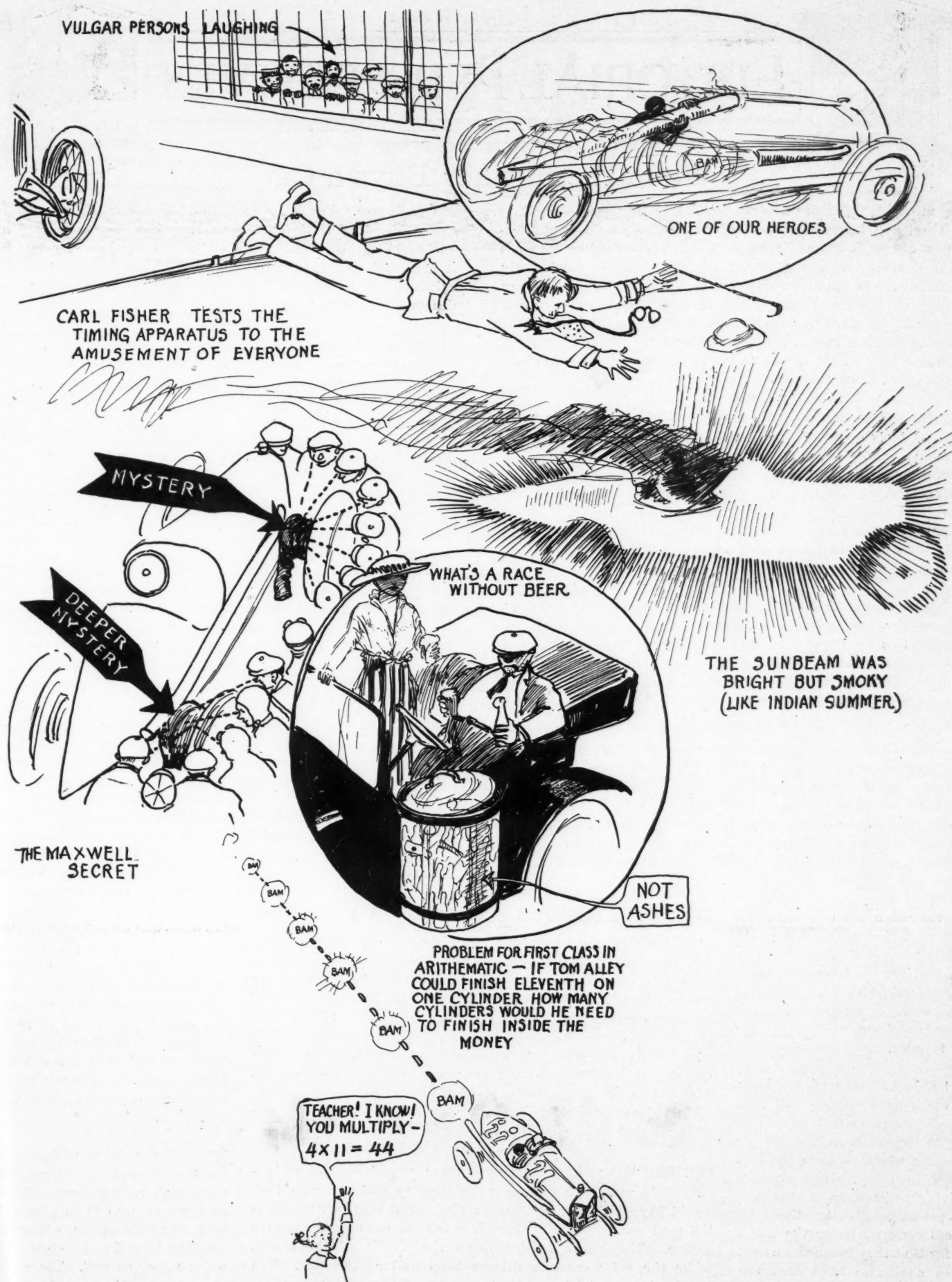
Delages May Be Docked

Harry Harkness, owner of the three Grand Prix Delages, stated tonight that he was ordering the cars shipped back to New York and that they probably would be withdrawn from racing for the remainder of the season.

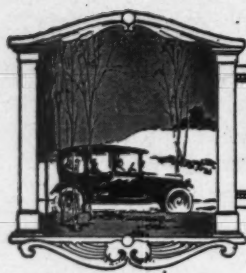
The serious injury of Lecain was the climax of the misfortune attending the fatal cars, Lecain's former teammates, Harry Grant and Carl Limberg, both having met death at the wheels of the Harkness importations. The Delages are entered at Chicago for June 10, but probably will not appear, it is reported on good authority. Oldfield's Delage is the only future contender of that make.



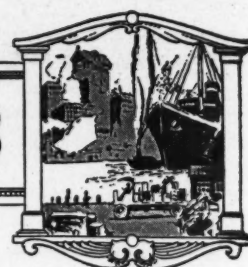
Aitken made fast tire changes. It was well that his pitmen were quick for he stopped four times for tires



Some of the Happenings You May Not Have Noticed



EDITORIAL PERSPECTIVES



When the Farmer Buys a Car

ASK any salesman or dealer which is the more difficult to sell, the farmer or the city dweller, and he almost invariably will answer "the farmer." The rural dweller does not take anything on the say-so of the salesman; he particularly searches for the hidden quality. The average city man is very strong on looks and design, but in many instances he is not possessed of much mechanical knowledge, but this does not seem a material factor with him because he knows he can get a repair man within a few blocks in almost any city in which he happens to be traveling.

THE country man adopts an entirely different attitude when he buys a car. He usually is motor-wise from having operated much of his farm machinery by gasoline motor and is familiar with the principle and operation of engines. He has before him all the time the thought that he must have a car that will take him there and back. He has visions of being laid up by the roadside 10 miles from home and 3 or 4 from help, and for that reason he wishes to assure himself that he gets a dependable car.

THEN again the farmer is not prone to take the question of car buying like a hungry fish does a baited hook, although this hardly can be said of the city man, except in a

few instances. The farmer studies car literature for months before deciding which car offers the most for the money he wishes to spend. With him money does not come so fast as it does with the city man. Consequently the farmer keeps the salesman on his toes all the time with his questions and he demands frankness.

THE urban dweller pays attention to externals, to the imity of the powerplant, to the color and appearance, while the ruralite wants to be shown the mechanical details of construction, particularly the hidden mechanism and the hidden qualities of materials. One is inclined to believe that the city buyer would do well to emulate the farmer in selecting his car. Of course, he will go to the shows and take the wife along to see which car looks the best, but ten to one if he is buying a rakish looking car he is doing it because the social set that he travels with demands classy appearance, whether quality backs it up or not.

USING discretion and learning carefully all one should know about detail of construction will mean less expense in upkeep and make for greater pleasure in your trips, be they short or long. Discernment is an investment when buying a car. Ask questions and see that you get satisfactory replies—facts.

Form Fitting Motor Cars

IF all the men's clothing were made after one pattern and over one model, how many of us would present a Beau Brummel appearance? Very few, indeed. We would insist on being fitted, even if we had to make our own clothes. With such sticklers for fit in clothes as some men are, why is it that more motor car manufacturers do not inject a little more of the form-fitting motor car philosophy into their designing? In Europe the dimensions of every one of the crowned heads are kept faithfully from year to year during their entire lifetime just as faithfully as their life span is recorded. However, in America we are obliged to depend on the records of the insurance companies for height, weight and dimensions of the average male, and these records are accurate only as far as they go.

NO doubt many of you have seen an extremely tall man wander through a motor show and try to deposit himself under the steering wheel of some car that takes his fancy. He assumes a driving position, or as near to it as possible, but often times his knees come up under the wheel so far that they touch the wheel. Then again we have seen the man with more than his share of avoirdupois squirm under the steering wheel and if he had a

serious thought of buying a car to drive himself it is doubtful if he retained it after he had loosened himself from the grip of the small space allowed in the driver's seat.

SOME of the manufacturers have taken steps already to remedy this evil; more should. The door nearest the wheel has been widened so as to give better ingress and egress to and from the car, but this is not true of all cars. Some have adjustable pedals and a very few adjustable steering posts and wheels. When this practice of making the driver's compartment so adjustable that any man or woman from 4 to 6 feet or more in height can reach the control pedals and drive in comfort, or so that the most portly or willowy forms can get back of wheel, then manufacturers may expect to please the multitude.

Hogging the Road

AS the number of cars on the streets and highways increase complaints of hogging the road become more numerous than ever. Seldom does one have cause to complain of the owner-driver, for he is reasonably careful. It costs him good money to motor and he has no liking for repair bills. With hired chauffeurs the case is different. They are young fellows who have often acquired little prudence of their own. They would not have to pay for their machine if it were smashed. Also they acquire a great deal of skill so that they can turn out the least possible distance, and make a turn the last possible moment before collision.

THESE last moment turns often are responsible for serious accidents. The road may be slippery and the turn that would have just carried them by the rear fender in time when the road was dry carries them into the car ahead and someone suffers. They come tearing down the middle of the street, while the more cautious drivers keep well at the side. The speeder keeps rejoicing along the center of the road, thus abandoned to his sole use, and congratulates himself that his daring operation saved him from losing 2 seconds by making a turn.

EASE of driving will go farther toward clinching a sale than most manufacturers think as the man who is to pilot his own car will quite naturally want to know he can do it and enjoy riding as well. There are many cars on the market now in which the driver's pleasure is reduced through cramped position.

Family Deserters Must Work on Roads in California

Statute Provides That \$1.50 a Day Salary Shall Go to Their Dependents

WASHINGTON, D. C., May 25—Road work affords a means of making the family deserter support his wife and children. California by statute provides that deserters and other misdemeanants shall be worked by the counties on the roads and a sum not exceeding \$1.50 per day be paid to their dependents for the work.

Miss Beatrice McCall, of the Woman's Protective Bureau of Oakland, has reported to the National Committee on Prisons that Los Angeles and Sacramento counties are enforcing this provision and employing their prisoners in road work. The bureau is endeavoring to have the statute enforced in Oakland county.

The movement to work county prisoners on public roads is also gaining ground in Louisiana. New Orleans passed an ordinance in 1907 providing for such work. Other counties have leased their prisoners under the lease system abolished as far as state prisoners are concerned by the constitution of the state. W. O. Hart, president of the Louisiana Prison Reform Association, has informed the National Committee on Prisons that the association is introducing a bill into the next session of the legislature to abolish the lease system even for county prisoners and extend the New Orleans system to other counties.

Kalamazoo county, Mich., ridded the county of tramps by establishing road camps for county prisoners. Salem county, New Jersey, found the road camp a means of overcoming crowded conditions in the jail. Georgia finds road work a successful means of employing practically all her county prisoners.

The movement for road work for short-term prisoners given impetus by the Nation Committee on Prisons is extending from county to county. Soon the old idleness and degradation of the county jail will have given place to health work on the roads, with wage which will keep many a family off the charity list.

LOSES PISTON FROM ENGINE

Editor Motor Age—Your Touring Number received and must say that I enjoyed it very much. I also appreciate the map. A local motorist had an experience which I have never heard or read of before and am wondering if some of your readers ever had a like trouble. This farmer motorist possessed a much-worn, second-hand Overland, which one muddy evening he backed out of the shed in which he kept it and proceeded to town. During the ride of about 3 miles he was unable to get same to hit on more than three cylinders, though he could find nothing wrong with the ignition or valves. After completing his trading he drove home, again making

most of the trip on the lower speeds because of the miss.

The following morning in crossing his tracks in the yard where he had turned around to go to town he found the complete piston and connecting rod. A hole through the crankcase showed its manner of escape.—Robert G. Nowe.

BAN ON JAY WALKERS

Chicago, May 29—An ordinance providing a fine of not less than \$2 nor more than \$100 for pedestrians who cross a street except at regular intersections within the district bounded on the north by Lake street, west by Market street, south by Twelfth street and east by Michigan avenue, was recommended for passage Saturday afternoon by the streets and alleys committee. Failure to obey the signals of the traffic police at street intersections within the district is subject to the same fine, the ordinance specifies.

CLUB MAKES GAS INQUIRY

Cincinnati, O., May 27—The Board of Governors of the Cincinnati Automobile Club has appointed a special committee to inquire into the price of gasoline, with Walter G. Franz as chairman. Unlimited authority has been given to the committee to inquire into the cost of gasoline

and also to contract for a supply of gas for the members of the club, wherever it can be purchased the cheapest.

Car owners believe that Cincinnati and other parts of Ohio is discriminated against in the price of gasoline. Minor Indiana towns, just across the state line, are selling gasoline from 5 to 7 cents below the price in Cincinnati. On the Indiana side of the town of Harrison, part of which is in Ohio, gas is sold as low as 18½ cents and across the river in Kentucky the price is 22½ cents.

SPECIAL CAR THEFT SQUAD

Philadelphia, Pa., May 27—Because of the increasing number of motor car thefts in this city the detective bureau has established a motor car division which will do nothing else but recover stolen cars and evolve a method whereby thefts will occur less frequently. Heretofore this branch of the bureau has been handled by two detectives who have had more work than they could successfully handle.

In the last year or so on an average of fifty or sixty cars have been stolen from the streets of Philadelphia every month. The congestion of traffic in the center of the city proved a big aid to the thieves.

See America First —
• • • See America Now



EDITOR'S NOTE—This is the eightieth of a series of illustrations and thumb nail sketches of the scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the points of interest in their own country.

No. 80—SNAKE CREEK IN WHITE MOUNTAINS, ARIZONA.

THE peculiar bed of Snake creek in the White mountains of Arizona is shown herewith. This is supposed to have been a wide stream at one time as the bed would indicate, but that it has decreased in size until only the lowest spots are covered with water.

Street Accident Records

New York Report Shows Education of Pedestrians Will Be Most Effective

Horse-Drawn Trucks and Street Cars Worst Offenders

NEW YORK, May 29—Some illuminating figures are contained in the classified tables of highway accidents soon to be published in the annual report of the police department of New York for 1915. The tables show that 10,653 accidents, of which the causes were given, 8,661, or more than 81 per cent, were due to the fault or incapacity of the injured person, and only 700, or 6½ per cent, to the fault of the driver.

Horse-drawn trucks and wagons caused 100 fatalities and injured 2,341 persons, while motor trucks and delivery wagons killed 105 during the year and injured 1,107. Passenger cars caused 177 fatalities and injured 4,688.

The total number of persons fatally injured during the year was 649 and the number less seriously hurt was 21,891. These figures, however, include 4,401 persons who sustained injuries in no way related to vehicles, such as falls on the sidewalk, hit by falling objects, bitten by dogs, etc. They also include 955 persons hurt by running into or in front of vehicles, 1,290 injured were improperly boarding or alighting from street cars, 417 when stealing rides, 1,271 when skating or playing in the street, 330 while intoxicated, etc.

NEW WISCONSIN GAS RULING

Madison, Wis., May 29—Garages and other sellers of gasoline, kerosene and petroleum products in Wisconsin are to be compelled to comply with the state law requiring them to keep placards posted conspicuously showing the specific gravity and flash tests, as the result of an investigation made in Milwaukee by B. N. Moran, state inspector of oils. For several years the posting of placards has been neglected, and those posted several years ago are far from correct. Inspector Moran found placards in many garages showing the specific gravity of the gasoline to be 68 to 70, when in reality the present grades sold test 59 to 60. The garages had simply neglected to post new placards and technically laid themselves open to heavy penalties. The state inspector also will enforce the law requiring gasoline to be handled only in containers painted red and labeled "Gasoline" in large letters.

PA. HAS GOOD ROADS DAY

York, Pa., May 26—Road work in Pennsylvania was given impetus yesterday when more than 100,000 persons responded to the call of Governor Brumbaugh and worked

on the state highways in the observance of state-wide good roads day. The good roads enthusiasts yesterday far exceeded the number of persons who worked on the road on the same day last year, when the day was inaugurated by the governor. A statement issued from the state highway department had the following to say:

"While no definite statement as to the number of men who volunteered for work can be obtained before next week, it is estimated that last year's figures of 78,000 will be considerably exceeded. The chief reason why many more men did not volunteer for work is found in the late farming season which prevented many farmers in some parts of the state from turning out. This, coupled with the scarcity of labor, due to the unprecedented industrial rush, kept down the volunteers, but despite these facts, the reports received indicate that more men were out this year than last.

MOTOR RESERVE CORPS PLANS

Los Angeles, Cal., May 26—The California section, motor car reserve corps, is to be represented at the civilian training camp, to be held at Monterey, Cal., this summer, if the plans of officers of the motor organization carry. Already three motor trucks have been pledged for the encampment by members of the Los Angeles organization and a number of touring cars are assured.

OLDS PRODUCTION TO INCREASE

Lansing, Mich., May 26—The production of Oldsmobiles, already well beyond the 10,000 mark per annum, is to be raised to 20,000 next season. This decision was arrived at by factory officials, after a careful canvass of the demand for the Olds product, and a thorough analysis of business conditions throughout the United States.

TO MAKE CAR BODIES

York, Pa., May 29—The Pullman Automatic Ventilator Mfg. Co., has announced that it has embarked in the manufacture of motor car bodies. An order for 100 bodies, of both the touring car and commercial types, has been placed with the company by the Bell Motor Car Co., and the bodies are now going through the factory. A number of other large contracts are also pending.

MOON WILL NOT CHANGE

St. Louis, Mo., May 26—For the first time in the history of the Moon Motor Car Co., there will be no radical changes in Moon cars for the 1917 season, according to Stewart McDonald, vice-president and general manager, who says that because of the congested condition of the material market, it is necessary to place orders for parts 6 or 8 months in advance.

This condition prompts the company to hold to the lines of the 1916 models to a large extent for 1917.

May Tax Trucks Higher

Massachusetts Roads Suffer from Heavy Inter-City Traffic Says Highway Body

Will Cost Bay State Millions to Repair Damage Already Done

BOSTON, Mass., May 29—Officials of the Massachusetts highway commission, have completed a tour of the state roads and were very much surprised at the conditions following winter. The roads in many places are in very bad shape, and the commissioners say that the motor trucks are to blame, and they intimate that the only solution is another increase in the tax on the commercial vehicles.

"Either the tax on the motor trucks must be increased or the tonnage will have to be reduced," said one of the officials after his trip. "One trouble is due to the overloading on the heaviest of the motor-propelled vehicles. These trucks weigh from 4 to 6 tons and when loaded with coal, iron, stone or some other heavy substance the total weight is increased to the 12 or 13-ton mark. This weight is too great to travel over the macadam roads, consequently many miles of Bay State highways throughout the state have been destroyed.

Authorities Complain

"Municipal authorities and county officials all through the state are complaining about the damage done by the trucks, and it forms one of the most perplexing problems we have confronting us. From December 1 to April 1 approximately \$12,000 was spent by our highway commission on roads in Worcester county, many of which highways are used extensively by motor trucks. Following the recent spring thaw much damage was done when the frost was leaving the ground and the surfaces were soft. The heavy trucks dug into the roads, leaving them in a deplorable condition.

"To take care of the damage being done will cost the state millions of dollars, and instead of \$3,000,000 spent annually now there will have to be paid out about \$5,000,000. The only other solution would be to use granite blocks or brick pavements, and to start building such roads would mean an expenditure of millions. There is now so much inter-city traffic by motor trucks in Massachusetts that something must be done quickly to save our highways."

TWIN CITY GAS 19½ CENTS

Minneapolis, Minn., May 29—Gasoline in the Twin Cities now is on a uniform basis of 19½ cents. The independent filling stations have put out a reduction of 1 cent, which makes the price the same as the Standard Oil Co. has had in effect some weeks.

"Charge of the Light Brigade," Motorized

Motor Cars Turn Tide for Pershing's Men in Chihuahua Skirmish

—Weird Wilderness Line of March

EL PASO, Tex., May 27—Some day, perhaps, there will be a poet who will write the modern version of the "Charge of the Light Brigade," but he will not write of horses, but of motor cars. In the European war, the motor vehicle has been used extensively for scouting purposes, but it remained for the men of "Black Jack" Pershing's brigade now in Mexico to utilize ordinary touring cars for a charge.

The story of a motor charge that will go down in history as the first of its kind is just getting to the border, though it was on May 14 that Lieut. George S. Patton, Jr., engineered his stunt.

Efforts to round up a bunch of bandits headed by Col. Julio Cardenas near Rancho San Miguel de Rubia, Chihuahua, failed when cavalry was used. The bandits seemed to get word of the approach of the cavalry. The officers then decided to try a faster means of transportation for the attacking force and three Dodge cars were used by Lieut. Patton and fifteen men in their attack on the Cardenas headquarters at daylight on May 14.

The approach to the ranch was over an open stretch of a mile, but the lieutenant had his machines ready for a speedy dash when they got in sight of the farmhouse where the bandits were believed to be making their headquarters. Shoving their gears into high, the chauffeurs cut open for high speed and the dash over the desert was made at better than 40 miles an hour. The machines were within a few yards of the ranch before they were detected and then half-clad bandits made their appearance through doors and windows as they streaked for some cover.

American Marksmanship Good

American marksmanship, however, proved too great a handicap for the bandits. Col. Cardenas was killed, with two of his lieutenants. The rank and file, to the number of a half score, made good their escape, but the band has been effectively dispersed through the death of the leaders.

"We couldn't have done it with horses," said Lieut. Patton. "The motor car is the modern war horse."

One hundred big trucks, loaded to capacity with army supplies, and crossing the misty Mexican desert at night, with the drivers and guards all silent through some strange psychology of the night, is a sight that will long be remembered by the few who had the chance to see it.

George H. Clements, now with the Pershing forces for the El Paso Herald, thus describes his experiences with this ghostly train of the desert:

By A. H. E. Beckett

"I had been given permission to accompany a truck train which was being sent 'light' to carry supplies from the base being abandoned to the new base about to be established. There were nearly 100 trucks in the train, or rather in the three trains—twenty-six trucks compose a military wagon train, and as they strive to maintain a uniform distance of 100 feet between trucks when traveling, we stretched out for, what seemed, in the moonlight, an interminable distance over the long, wide valley through which lay our ordered way.

Picturesque Wilderness

"From the standpoint of picturesqueness the scene or series of scenes presented during that long night ride surpassed anything which has fallen under my observation during this or any other military campaign in which I have ever participated nor have I ever seen a military parade in time of peace in which there was so much of the spectacular. The great plain over which we traveled for the greater portion of the night was of such width and length that an army of 100,000 men or twice that great number might have been maneuvered in it without crowding. It had been burned over by the fires which had been started, presumably by the enemy, for the purpose of destroying the grass in order to make it harder for the thousands of cavalry horses and other thousands of army mules to find grazing, and it was black and forbidding, but the moonlight at this elevation gave sufficient light to see all that transpired from mountain range to mountain range on either side.

"Our way lay along the well-defined wagon trail through the approximate center of the valley. For hours we passed through lines of cavalry with their flankers and wagon trains; similar lines of horse and field artillery and regiments of plodding foot soldiers. In many respects it was a weird procession. The men in the ranks were as silent as though they were approaching an enemy which they hoped to surprise. An occasional 'close up, men' might be heard as the officers, commissioned and non-commissioned, looked after their charges. The rumble of wagons and the ringing of iron shod hoofs of the horses and mules on the stones which beset the way caused an incessant though undertoned roar, which did not carry far.

"There was no particular necessity for all this silence. It was not enjoined; the men were silent because the psychology of the situation impelled silence. There was no enemy in sight nor was

one supposed to be lurking in the hills paralleling the valley on either side. Nor was the march being made at night for any purpose except that it relieved the men and animals of the stress of marching under the rays of the tropical sun and which, despite the great elevation above the level of the sea, are very hot during the middle of the day."

PREMIER APPOINTS MANAGERS

Indianapolis, Ind., May 26—The Premier company has appointed district managers as follows: East, H. C. Arnold, formerly with Hudson in Chicago; South, F. P. Merritt, of Overland; Middle West, H. L. Pelton, formerly Chalmers; Southwest, A. G. Dale, formerly sold Chandler; Northwest, R. S. Ellis, formerly with Winton in Detroit; Pacific Coast, Preston A. Berry, formerly distributor of Packard and Hudson in Tacoma.

THREE-PASSENGER MITCHELL

Racine, Wis., May 25—A new three-passenger roadster is out as a part of the new Mitchell line and the staggered seating arrangement, slanted windshield and close up position of driver without the crowding of any one passenger being features.

The roadster has long wheelbase and cantilever springs, Bate two-unit, three-point suspension construction. On account of exclusive construction ideas, the roadster rides as easily and with just the same comfort to the occupants as does the seven-passenger Mitchell.

PREMIER TO BE READY SOON

Indianapolis, Ind., May 26—Details on the new Premier six which will be put on the market within the next few months by the Premier Motor Corp. are just beginning to be known to the industry. The present organization which has taken over the huge plant of the T. B. Laycock Co., manufacturer of bed springs, already is to go ahead as soon as the machinery which has been ordered is installed and started on production.

Modern ideas are incorporated throughout the chassis.

Among the other important specifications of the car is the Cutler-Hammer electric gearshift. Collins curtains that open with the door will be used. The price will be, according to present plans, under \$1,700 for a seven-passenger touring model.

This concern is now occupying an ideal plant covering a tract of 40 acres and having a floor space of about 327,000 square feet.

A Day in the Land of Manana and Bull Fights

Tia Juana, Mexico, Across the Border to the South of California,
an Interesting Study



Cars of all kinds lined the road as far as the eye could see

It was the most opportune of occasions to spread the name and the fame of Old Glory. It was the Fourth of July, America's day of independence, and Americans of sufficiently independent means to enjoy a motor car were bound that they should make use of this—and this to the edification of their neighbors 'cross the international line.

What was more—the notion went to typify the ultra-independence of the American—even of his own government, if he felt like it. President Wilson had warned all Americans out of Mexico and the warning still stood in full force. There had been brushes innumerable between Mexican guerilla bands and the Texans along the same international border—and yet, down here below San Diego, Americans, in hordes, were streaming over the line to Tia Juana, to witness one of the fiercest bullfights that gory ring has known.

Some Patronized the Railway

Not, of course, that everyone went all the way by motor. Some folk patronized the little railway that extends a part of the way, and then employed the motor buses to take them to the ringside.

The rest went in their own machines, hired machines, the most from San Diego, tourists from every state in the land, who had motored down to see the big expositions and now would travel to the banner Mexican bullfight.

And so, to come to conclusions, there were machines of every kind and man-

ner and shape. There were new machines and old, there were new machines that looked old, having been fresh-launched on this trans-continental journey and receiving as hard wear in these last few months as many receive in years. Then there were old machines that looked new; there were runabouts and touring cars; there were even trucks purloined to pleasure purposes for the day, even as the poor bookseller's boy of the Queen City will purloin his master's little delivery wagon for a Sunday afternoon's pleasure ride.

Tia Juana, it needs be recalled, fairly lived from these American tourist invasions, and the wily Mexicans thereabouts were rejoicing in the fact that Villa controlled all this part of Mexico and that Villa, at that time, courted favor with the Gringo. As a result, they are presumed to

pay well to keep soldiers near for protection of the foreigners visiting, and an American was as safe in Tia Juana, on bullfight days, as an Englishman would be, or a German.

Motoring Tia Juana-ward, however, has its features which are novel to the stranger from afar. For one, you note the number of cars bearing waterbags at either side, this the needed precautionary ounce, for if one run out of water in certain sections of this big Southwest there is no water to be had in miles.

A Maudlin Arroy of Caps

Then, too, the innumerable trans-continental tourists in the medley, with cars showing every sign of wear, gave the whole array a rather maudlin look. Then there is dust in plenty, down along the border, and it's warm, so milady bears a sunshade, preferring this to putting up the hood.

Starting at the beginning of things, with this ride, it would seem as though every San Diegoan and every stranger in San Diego had managed to find place in some motor car for this occasion.

Out and away, through the city proper, then through the charming suburban districts, then out in plain view of giant saltbeds, and through National City, the southwesternmost city of the United States. From National City the road largely parallels a little jerk-water railway built down to the frontier, and the quaint trains to this, the wee locomo-



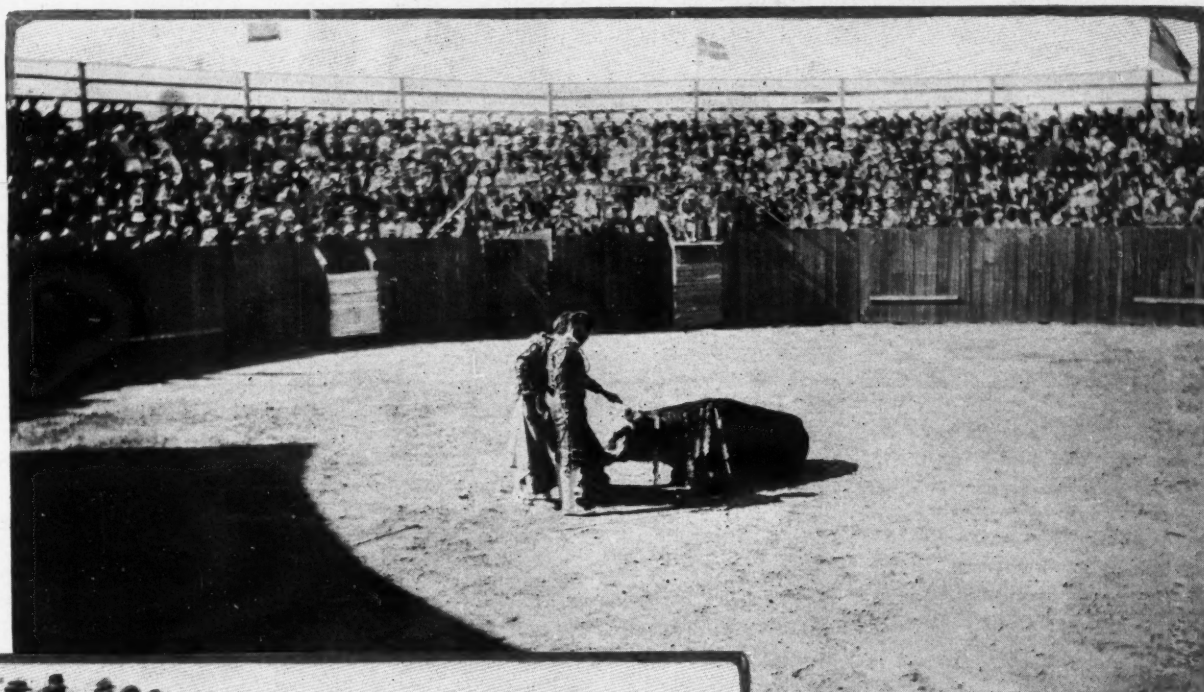
He should worry! Resting is a habit with the Mexicans, even though young

Snapshots of the Route and Crowds on way to Tia Juana



Above—The streets were desolate during the matador's struggle to overcome the bull

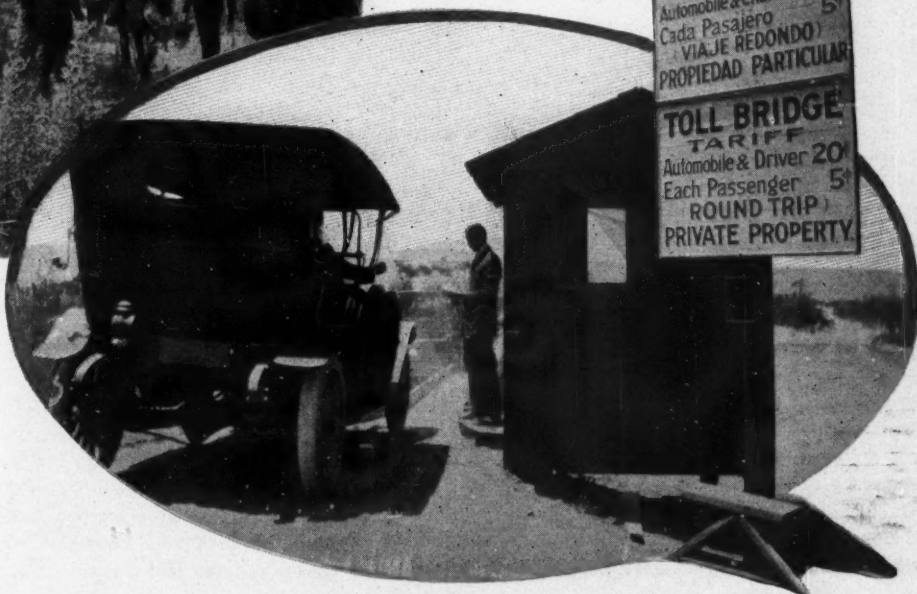
Right—One of the many carryalls that brought the crowd to the arena



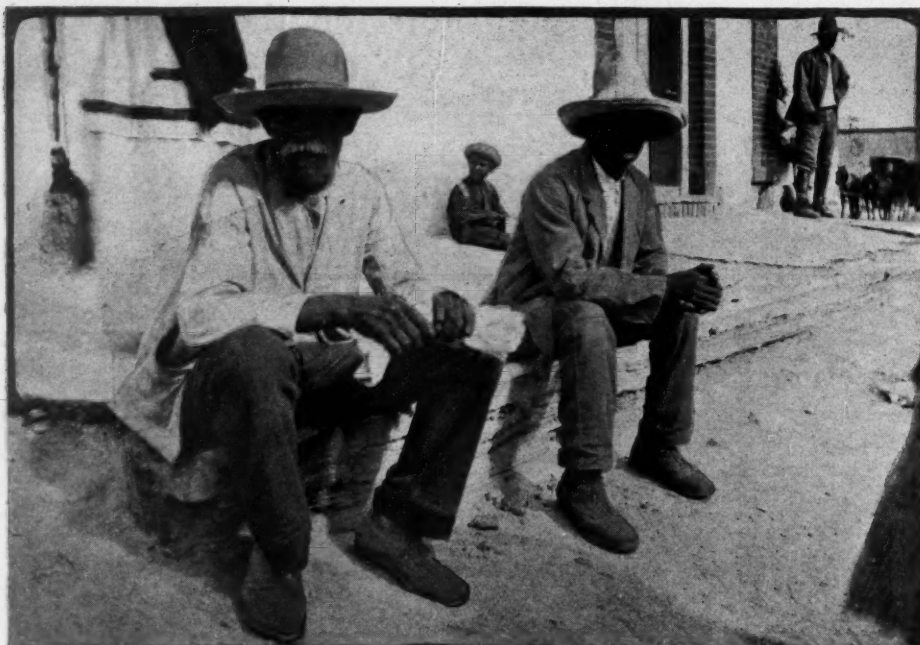
An endless stream of cars poured across the border and many who were not fortunate enough to have cars walked. They were keen for the gore of the arena and nothing stopped them

In circle—The international bridge and the gate where toll is levied against all traffic

Where they don't use the ring outside, nor tie the bull in any way



PUENTE DE PAGA
TARIFA
Automobile & Chaffeur 20¢
Cada Pasajero 5¢
VIAJE REDONDO
PROPIEDAD PARTICULAR
TOLL BRIDGE
TARIFF
Automobile & Driver 20¢
Each Passenger 5¢
ROUND TRIP
PRIVATE PROPERTY



Types—The folk of manana land where things are done tomorrow—the day that never comes

tive followed by cars one-half of each built open, one-half closed, seem attempting to race with your machine all the way.

The clouds form and break as you advance toward the border, giving a curious air of gloom to the war-sodden land on beyond. At one place a great factory where olive-oil was long extracted, takes the eye, at another huge beds of dahlias, between walk and street.

The country consists very largely of flats and there are few grades to climb. Now and then lagoons will be encountered, the pond-lilies seem calling to be plucked. Again, to go motoring across the endless salt-marshes that follow, with the small pools of brackish water extending off and away, far as eye sees to left, is a novelty to many an inland dweller.

Mammoth Strawberry Bed

Rolling away to the breaking skies, at still other places, a huge strawberry farm calls for attention—this so large as to take rank with the greatest in the world.

Not a few folk in the cars read the Sunday papers as they ride; then toss them to the pike. The road is edged with blue gum trees for a way, affording a pleasant shade; at another point you ride through an orchard, wee ranches they'd be called anywhere east of the Pecos, accost you at the roadside, and some patriotic children fire a cap pistol at you as you go by.

In due time far to the left dim mountains rise over those flats. You remark a curious red flower everywhere in the prairie, a low little herb, all the prettier for the tall eucalyptus trees which tower above. Mexicans, with very loose blue "artist ties" to the soft collar rounding off to the black hat, are beneath one such tree; exiles who've done well in the foster-country.

Once more there's a monster salt works in view, sacks of salt at the roadside, trestles behind, then you skirt the edge of

the big salt lagoons, while the train you've been racing all of the way steals a march on you here and takes the trestle built squarely across.

Nearer, ever nearer, rise the mountains ahead. Scrubby little farms, their owners' homes peering out from some clumps of palms, intersperse vineyards. Other features of an ordinary country landscape follow; at the heart of it all there's a church in the old Mission style—cross at top. Then you cross the railway and enter the hills that mark the approach of the goal. Grazing country abounds on this section of way. There are bungalows, with little truck gardens, where man and wife stop to watch us pass and chat as they hoe. The hills grow ever taller on the right, then we are among them.

For the most part the country remains scrubby with melon fields to intersperse. Cattle, too, are numerous; occasionally there is a farm, a tall, wooden windmill looms at one side, then the hamlet of Palm City is passed. Queer little shacks, their sides adorned with circus showbills, and, off at left, next some buildings, a long line of palms.

It is only 18 miles from San Diego to Tia Juana, but the crowding machines make each car travel slow. As a result, it's some time before you are at Nestor, the cross-road store with flag flying, postoffice, then a little frame church, that is all. You bend off into the fields toward where huge mountains rise ahead; then make way, while a great sightseeing car from San Diego goes by on a tear and careens off ahead. Wagons laden with companies of pleasure seekers also chose passage and 3 miles from Tia Juana

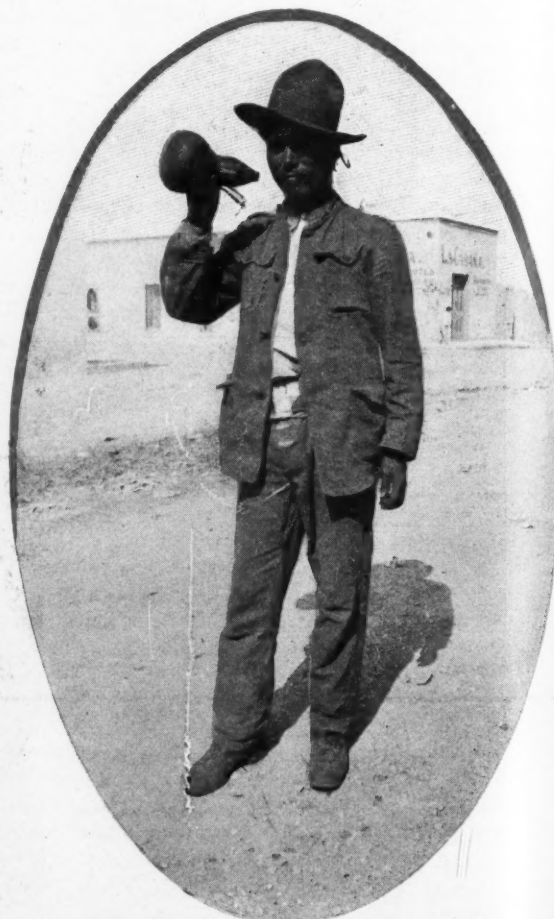
a man quietly plowing stops to watch them as they go by. Rolling country, given to chaparral largely, stretches on to the mountains. As you loaf along over this you see hay cut to bales out in the fields, lone ranches with their windmills bespeak near approach of the border, wherefor motorists take on speed and whistle for way and the water bags rattle merrily as they take to hills getting closer and frighten the cattle, which gallop to the pumpkin fields on beyond.

Flag Above Flag

Finally, at San Ysidore, the Mexican and American flags, each on its pole above a small frame customs station, towering up above the few bungalows, the ranches and the lone railway station at the track that comprise this town in the pocket of the loneliest hills, marks the actual line. You learn that on the return from Tia Juana you are permitted to bear with you a dollar's worth of merchandise duty free, and 25 cents worth of cigarettes beside. Out in the dusty road the motors seem to make space for no end of smuggling. Some hay fields lie ahead, then away off to the right the double domes of the Tia Juana fair grounds indicate the proximity of the bull ring and the goal.

But you do not get there so quickly.

Traffic congestion before is as nothing to now. You have come to the end of the railroad and all its travelers are disgorged onto huge motor buses that carry the folk to the ring. By and by you come



The handy olla which flows continuously



Gossip finds a place over the border as well as elsewhere

to snail's space where you pass over a toll bridge broad enough for one car only. Pedestrians, too, choke this passage.

Meanwhile, inch by inch, you are progressing. The toll bridge has runways for the wheels of the car each side. The center is of slat work and you could not pass your neighbor if you dared. Toll is 30 cents on the bridge here and it's worth it, if only for the experience of a part in the motor parade on the runways of the creaky old bridge across the dry Rio Grande del Norte and the bird's-eye of the weedbeds that cover its banks.

Over the bridge and all is action—you are in Tia Juana there! You must drive



Map of road from San Diego to Tia Juana, Mexico

through the little Mexican town to the plaza, park your machine and secure your seat in the ring.

After that you lose yourself in the bull fight, not that you approve—for it is cruel and gory—but it is THE sight to be seen.

MEXICAN OFFICIALS JOIN CLUBS

Los Angeles, Cal., May 26—Many of the high Mexican officials of lower California are planning to join the Automobile Club of Southern California in order that they may assist in the sign-posting and mapping activities which the club now is engaged in throughout the Imperial valley. Governor Cantu has led the way and is now an active and enthusiastic member of the club.

GOOD ROADS FOR TOUR

Minneapolis, Minn., May 27—Log-making for the Yellowstone tour to start from the Twin Cities July 20 having been completed, the attention of the National Parks Highway Association is now being devoted to putting the roads in condition for the coming excursion. Nearly \$100,000 will be expended in the coming 2 months in this effort to complete the chain of boulevards stretching to the Gardiner entrance.

BARGAIN GASOLINE DAYS

Savannah, Ga., May 26—The new records for gasoline prices in Savannah were established when it began selling for 25 cents a gallon cash and 26 cents a gallon charged, which are the prices now prevailing. This is a jump of more than a cent a gallon over what was already considered a most outrageous price. Indications are that if the price changes again it is likely to go still higher. A top level of 30 cents at least is expected to be reached.

Captain Stephen N. Harris, of the Harris Tire Co., is among those dealers who believe that the price is unreasonable. Seeing in the situation a chance for building up a large trade in gasoline against a return to normal conditions, Captain Harris has caused to be inserted in the local newspapers and distributed by circular letter to all owners the announcement that on certain days in each week he will sell gasoline at a reduced figure.

FOREIGN TRADE FOR APRIL

Washington, D. C., May 26—American exports in April reached a total of \$404,300,000, which is \$6,500,000 less than the record figure of March, but a million dollars more than the total for February. The Bureau of Foreign and Domestic Commerce, however, estimates that the exports per working day in April were valued at \$16,200,000, exceeding the daily average for March by \$1,000,000. For the 10 months ending with April American exports totaled \$3,401,100,000, an increase of \$1,175,300,000 over the like period of last year.

Imports for April amounted to \$217,800,000, or \$4,200,000 more than for March and exceeding by \$65,200,000 the April average for the preceding 5 years. Imports for the 10 months' period ending with April totaled \$1,722,400,000, an increase of \$348,200,000 over the corresponding period last year and unequaled by the corresponding period of any previous year.

The favorable trade balance for April was \$186,542,616, being over \$52,000,000 larger than that for April, 1915, and comparing with an import balance of \$11,209,544 in April, 1914. Ten months to the end of April last gave a total excess of exports over imports of \$1,678,700,000.



The bargain sale. The folk of Tia Juana live by trade with tourists

Set Two Race Dates Vanderbilt and Grand Prize to Be Staged on Santa Monica Road Race Course

Former on November 16 and Latter
will Follow 2 Days Later

LOS ANGELES, Cal., May 26—The dates for the Vanderbilt cup race and the International Grand Prize, which are to be staged on the Santa Monica road race course this year, have been announced. The tenth annual Vanderbilt cup event is scheduled for November 16, and the Grand Prize race will be held on November 18. The Santa Monica Chamber of Commerce, which is promoting the events, has reserved these dates, and Richard Kennerdell, chairman of the contest board of the A. A. A., has assigned the 2 days to Santa Monica. It is expected that the official sanction will be granted in time for the committee of the Santa Monica Chamber of Commerce to have entry blanks printed and circulated among the drivers at the Indianapolis race May 30.

Although the races are six months away, the course is already under reconstruction for the events. The fast stretch along the Palisades has been repaved and work will be begun soon upon the Nevada avenue stretch. When these improvements are completed the Santa Monica course is expected to be the fastest road way course in the world.

PREDICT BIG CROWD AT CHICAGO

Chicago, May 29—A record advance sale of more than 30,000 reservations for the second motor derby to be run here June 10 has been announced by the officials of the

Racing Events

- *June 4—30-mile race, Sheepshead Bay speedway.
- *June 10—Chicago speedway race.
- *June 20—100-mile race, Galesburg, Ill.
- June 23-24—Interclub reliability run, Chicago.
- June 26—Des Moines, Ia., speedway race.
- July 4—Minneapolis speedway race.
- July 4—Sioux City speedway race.
- *July 4—Track meet, Coeur d'Alene, Ida.
- July 4—Road race, Visalia, Cal.
- July 4—Track meet, Elmira, N. Y.
- July 15—Omaha, Neb., speedway race.
- July 15—Track meet, North Yakima, Wash.
- July—100-mile track meet, Burlington, Ia.
- August 5—Tacoma, Wash., speedway races.
- *August 11-12—Hillclimb, Pike's Peak, Colo.
- August 12—Track meet, Portland, Ore.
- August 18-19—Elgin road race.
- August 26—100-mile track meet, Kalamazoo, Mich.
- September 4—Track meet, Elmira, N. Y.
- September 4—Indianapolis speedway race.
- September 4—Des Moines, Ia., speedway race.
- September 4-5—Track meet, Spokane, Wash.
- September 16—Speedway race, Providence, R. I.
- September 29—Track meet, Trenton, N. J.
- September 30—New York, Sheepshead Bay speedway race.
- October 7—Philadelphia speedway race.
- October 7—Omaha speedway race.
- October 14—Chicago speedway race.
- October 19—Indianapolis speedway race.
- October 21—Track meet, Kalamazoo, Mich.

* Sanctioned by A. A. A.

local speedway, who now expect forty starters when the entry lists close on June 1.

Coming as it does during the week of the Republican and Progressive national conventions the demand for seats from out of town have been heavy. This does not mean, however, that there is any shortage of seats, for the huge grandstands hold close to 150,000, but it is an indication that the local race will break all previous records so far as attendance is concerned. Last year 80,000 viewed the battle for first place with only an advance sale 2 weeks before the race of 5,000 tickets.

There undoubtedly will be two Hudson cars in the race. Vail has already entered the one in which he scored at New York and Ralph Mulford has sent word that he has a new Super-Six at Indianapolis that he will enter in the Chicago race along with his Peugeot. He will probably handle the Hudson himself and it is rumored that Joe Dawson will return to the game at the wheel of the Peugeot.

TRUCK CONTEST IN CALIFORNIA

San Diego, Cal., May 26—An application for a sanction for a motor truck reliability run from Los Angeles to the motor demonstration field at the Panama-California Exposition, was made this week to the contest board of the American Automobile Association by a representative of the Motor Truck Dealers' Association of Los Angeles. The reliability run is to be staged July 15 and 16 and the second day is to be known as Commercial Vehicle day at the exposition. This is the first motor truck contest ever staged in southern California under A. A. A. sanction and it promises to be the greatest contest of its kind ever held in this country. There are ten tentative entries on file now, the entrants waiting for the sanction to be granted and the official entry blanks to be issued.

PLAN CIRCLE RACE

San Fernando, Cal., May 26—The commercial club of this city has started on the preliminary work for a race to be run over the 4-mile course around the city. The event is to be a sanctioned A. A. A. contest and it is quite probable that entries will be limited to cars of 231 cubic inches and under.

TRI-CITY ROAD RACE

Brawley, Cal., May 26—The Imperial Valley is to have a road race. Motor race boosters have been at work for the last 2 weeks and a purse of approximately \$5,000 has been subscribed for a race over a course which takes in the three Imperial Valley cities, Brawley, Imperial and Calexico. The length of the course is approximately 25 miles. The event is to be run under A. A. A. sanction and a representative has been sent to Los Angeles to confer with Al. G. Waddell, representative of the A. A. A. contest board, in regard to the sanction and the appointment of officials.

Twin City Amateur Meet Second American Speedway Event for Non-Professional Drivers Gives Thrills

Times Made Were Not Equal to
Chicago Event 10 Days Ago

MINNEAPOLIS, Minn., May 30—Fifteen thousand people witnessed the Twin City speedway races today at Fort Snelling, the entries being amateur drivers with the exception of Lee Oldfield in an Oldfield car. The 2-mile concrete track was in fair condition. Twenty-one entries participated in the four events. Time was ordinary and the only exciting moment was when C. W. Jewett, in a Jewett car, an overhauled Ford, crossed the wire one-fifth second ahead of C. J. Gilbert's Mercer after a neck-and-neck race for the five laps in the 10-mile handicap, which was won by M. Sorenson in a Duesenberg in 8:35%. A. M. Choates, in a Carnation, was fourth in 10:21. The purse was \$300. Fifteen entries were made in the 50-mile race which was run in two sections, the total purse being \$2,000. A Duesenberg won in 40:56, a Mercer second in 40:32%, H. C. Feichtinger's Marquette-Buick third in 41:40% and Jewett fourth in 49:41%.

Jewett won the first 10-mile event in 9:33, Clyde Mohrs, in a Buick, was second and Hall, in a Ford, was fourth. There were five entries in this event in class C, division V non-stock up to 230 cubic inches. Prize, \$300.

An interesting event was a non-stock race in the same division and class, 231 to 300 cubic inches, 20 miles for \$300 with four entries. This race was won by a Mercer in 17:56; A. J. DeFeas' Velie was second in 18:50%, and R. Douglas' Corbin third, in 23:32%. The Twin City trophy race for owners and drivers of Twin Cities was eliminated by darkness. Two motorcycle events were run and Ruth Law in an aeroplane beat a motor car for two laps of the track.

Race Entries to Date

CHICAGO, JUNE 10

Distance, 300 miles.....Purse, \$30,000	
Driver	Car
Christians	Sunbeam
Franchi	Pu Sun
O'Donnell	Duesenberg
D'Alene	Duesenberg
Buzane	Duesenberg
Alley	Ogren Special
Resta	Peugeot
Oldfield	Delage
De Palma	Mercedes
Vall	Hudson
Newgard	Duesenberg
Adams	Adams Special
DeVigne	Delage
Not Named	Delage
Not Named	Delage
Chandler	Crawford
Davis	Crawford
Johnson	Crawford
Rawlings	Duluth Special
McCarthy	Hudson
Halbe	Osteweg
Not Named	Burman Special
Mueller	Dans l'Argent
Stringer	Hotchkiss Special
Mulford	Peugeot
Brown	Julian Special

Engine troubles were the main causes of failures to finish. The cars were prepared and entered by amateur drivers and with the exception of the Jewett were mainly local. Mr. Jewett is state president of the Retail Automobile Dealers, and drove his own car. Although the races lacked the glamour of world-famous drivers that took part in the initial 500-mile event last September, the attendance was as large.

EXPOSITION RACE PLANNED

San Diego, Cal., May 26—Plans are under way for another motor race at the exposition. The event is to be staged over the same course that Burman, Oldfield, Durant and Tetzlaff raced over in April. The A. A. A. representative has refused to allow more than five cars to start on the course and the field will be cut to the five fastest cars by elimination trials. It is planned to have the race at night, under the glare of the electric lights.

TACOMA RACE POSTPONED

Tacoma, Wash., May 30—Special telegram—Rain put a damper on the speedway events scheduled for today and the officials postponed the meet until June 4.

MASS. ASSOCIATION PLANS WORK

Boston, Mass., May 26—Law enforcement and safe highways were the two prominent keynotes struck at the quarterly meeting of the Massachusetts State A. A. meeting here last week at which there were present directors representing all the motor clubs in Massachusetts. Vice-President John P. Coghlin, of the Worcester Automobile Club, was elected president to take the place made vacant by the death of Lewis R. Speare, and President George W. McNear, of the Bay State Automobile Association, was chosen to fill the office of vice-president. Directors to the American Automobile Association were chosen as follows: Vice-president McNear, representing the Bay State A. A.; A. E. Leache, Springfield A. C.; Dr. George D. Dutton, Pittsfield A. C., and Dr. Woodward, Fitchburg, A. C.

A motion was passed that the association send a letter to each club forming the association requesting them to appoint a highway safety committee, which will receive complaints from members of their respective clubs. Minor complaints will result in letters to the law violators. When there are flagrant violations the club will present the facts to the Highway Commission requesting that suitable action be taken on the matter.

Another motion was passed that President Coghlin and Professor Gallup, of Worcester Polytechnic Institute, take up with the highway commission the matter of compelling the police authorities to see that the headlight law and the law as to all vehicles having lights be enforced.

Moonlight Motor Dash

Plan Event on New Course Formed by Big Galveston Storm Last Year

Fifty Thousand Dollars in Prizes and a Unique Trophy

CORPUS CHRISTI, Tex., May 30—The Neptune Moonlight Motor Traffic is the enchanting name given to a proposed moonlight motor dash over a course made possible by the action of Neptune and the other elements during the great Galveston storm last August which piled up an isthmus of sand linking Mustang and Padre Islands and forming a veritable speedway.

The Texas Good Roads Association is sponsor for the race, which, if plans materialize, will be held on this course from Corpus Christi to Point Isabel, August 11, and for which a purse of \$50,000 will be hung up in addition to a magnificent trophy. The race will be either 125 miles straightaway, which is the length of the course, or a circuit of 250 miles, the start being made here.

Arrangements are being made with the War Department and the Texas National Guard to have radio stations every 10 miles to flash the numbers of the leading cars. Field wireless stations every 25 miles will flash the order in which the cars pass and their times. These results will appear on an electric and fireworks display board and the numbers of the leading cars will be spelled in letters of fire in the sky by Katherine and Marjorie Stinson in their aeroplanes. In the 2 preliminary days it is planned to have every sort of motor power represented including submarines, aeroplanes, hydroplanes, and the new land-water motor boats.

The start will be made at midnight and to the winner will go a unique trophy in addition to the prize money. The trophy is to be of bronze and gold, fire-gilded groups and it will be 3 feet in height. The base will represent the sea and beach with Neptune emerging waist deep in the surf, holding the world in one hand and a submarine model in the other. Neptune will be gazing up at Luna, the moon goddess, standing on the earth, supported by the goddess of speed. The model of an aeroplane will be held aloft by Luna with one hand and the other will reach toward Neptune, while around the earth, racing cars will circle on a great beach speedway and on the waters of the base speed boats and hydroplanes will be depicted.

PLAN GREATER MOTORING SAFETY

Boston, Mass., May 26—One of the most important conferences planned to promote the safety of the public in connection with motoring was held at the state house last week, and for which Senator John A. Hai-

gis, chairman of the Roads and Bridges committee, was responsible. He had his entire committee on hand, and asked Senator Ezra W. Clark, and Representative Allen, both of whom had introduced motor bills to attend. Senator Clark spoke first, and he said he favored subjecting every motorist to a test of his physical fitness, and also would like to see the penalties for drunken and reckless driving increased.

Col. Sohler said that it would be all right to increase the penalties, but when that was done it would lead to less convictions because the motorists would appeal cases, and with good attorneys they would beat them in the high courts. And as some of the convictions in the lower courts are based upon the mere say so of one police officer whose word is always accepted by the judge against that of the motorist it would be unfair to deprive a man of his license until the case was settled in the higher court, as many such men would be proven innocent.

HAYES TO MAKE WIRE WHEELS

Jackson, Mich., May 29—To meet the demand for wire wheels as well as the wood type, the Hayes Wheel Co. has decided to manufacture the wire type along with its wood wheel production. General selling agents for the Hayes wire wheel will be the Castle & Kyte Co., Detroit. The latter is a new organization composed of F. E. Castle, head of the F. E. Castle Co., and H. W. Kyte, former assistant general manager of the Houk Mfg. Co., Buffalo.

STOCKHOLDER FILES SUIT

Findlay, O., May 26—The recently organized \$4,000,000 Grant Motor Car Corp., Andrews & Co., Chicago, and Cleveland, Charles Counselman and Archie Andrews, Chicago, and George D. Grant, Detroit, and David A. Shaw, Findlay, were made defendants in a rather sensational suit filed this afternoon by William E. Stephenson, one of the former stockholders of the concern. The latter charges that he has learned that the defendants named had formed what is termed a voting trust and have named Counselman, Andrews, Grant and Shaw as trustees for the purpose of holding all the common stock of the corporation. He charges that they control the election of officers and can name salaries to be paid themselves as such officers and also to control the policy of the corporation. He charges also that they control the sale of the common stock and the price to be paid for it, and to deal in common stock among themselves in such a way as to lead prospective customers to believe that common stock was of great value, so as to permit defendants to sell their common stock at a fictitious price. He alleges they are holding his stock and other stock not owned by the voting trust, refusing to permit plaintiff and all other stockholders from disposing of their stock.

Firemen Chip in to Buy Machine

Whoever Is Off Duty May Use It—Share Expense of Repairs

FITCHBURG, Mass., May 29—Members of the Fitchburg, Mass., fire department have solved the problem of motoring on their day off. They have gone into the buying of cars on the co-operative plan. Five members of the department now own two cars. One car was purchased by three men and the other by two. The firemen each contributed a certain amount. As the men have 1 day off in 5 and no two of the men are off on the same day they can use the cars nicely. They each keep track of the expenses and these are divided equally. On the gasoline problem the rule is that when one of them has used the car he must fill it up with gasoline and oil when he is through with it so that the

next fellow can start out with full supplies. Then the latter can journey as far as he likes and fill up as often as he wants to on his trip. It is also stipulated that the men will chip in for repairs if any one of them has an accident. The new plan is being watched with some interest in the city and it may be extended.

CAMPAIGN FOR ROOKIES

Boston, Mass., May 29—Uncle Sam has decided to utilize the motor car as an adjunct to its recruiting policy and it has given Sergeant B. J. Doherty, of the United States Marine Corps stationed at Boston, a machine to go about the New England territory looking for rookies. The

car will carry along a couple of men who will have all the data on the service and measuring implements so that it will be possible to see if a prospective recruit is eligible for enlistment. The car will make stops at different cities and wherever young men are congregated such as at ball games or other out-door sports the officers will make addresses on the benefits of joining the corps. The same plan will be tried out in some of the other big cities, it is said.

MACAULEY TO HEAD PACKARD

Detroit, Mich., May 31—Special telegram—Alvan Macauley has virtually been president of the Packard company for the last 2 years and the upbuilding of the Packard organization is in his hands and the responsibility is his. Henry B. Joy, the present president of the company, has been working toward the end of broadening and strengthening the organization to meet the conditions of its very much



In 1950

"These cars of today are the things," said I,
As I threw on juice and the trees sped by
Till the velvet tread of my tires so fleet
Left the state highway for the city street.

'Mid a maze of cars slipping smoothly past
I wended my way and drew up at last
'Neath the Motor Inn's much battered sign,
Which brands it "Established in 1909."

But no porter came to usher me in
With a bright salute and a cheery grin.
So, strolling around to the parkway lawn,
I found where the inn's whole staff had gone.

Surrounding a car that rumbled and roared,
Guests, porters and clerks were grouped on the sward.
A relic of days when the inn was new,
The old motor labored and puffed and blew.

Each onlooker's face was filled, I saw,
With wonder and reverence and silent awe.
As the Inn's great portals were opened wide
And a man strode forth, and all stepped aside.

He lifted his tile as all bowed low
And climbed to the seat of the old tonneau,

Where he sat as a king might grace a throne
Each atom of which was a precious stone.

Chauffeur and footman, in livery grand,
Awaited the wave of their liege lord's hand.
A nod to the crowd with a brief "good day,"
A clash of the gears and they rolled away.

The crowd straggled off down the well-kept lawn
And watched till the car's trail of dust was gone.
But mine host still stood at the inn's great door
And smiled when I greeted him as of yore.

I asked with a laugh as he took my hand,
"Is your latest guest a lord of the land?"
With a gasp of surprise, he stopped, amazed,
As though from my question, he thought me crazed.

"Don't you know who that was?" he almost shrieked,
And his voice grew shrill till it fairly squeaked.
That man is the Croesus of modern times,
Counts millions of dollars as we count dimes."

Mine Host's voice dropped and he spoke in awe
As of something beyond all natural law,
"That man is so rich that, where'er he's seen,
He drives in a car run by gasoline."

enlarged business. Conditions require more help at the top and the title of president of the company will be conferred on Mr. Macauley in the near future at the request of Mr. Joy and with the approval of the directors as a well merited recognition of Macauley's ability. The change in titles of the officials of the company will not change the conditions which have been in effect for much more than a year.

ARGO BUYS HOME PROPERTY

Jackson, Mich., May 26—The Argo Motor Co. has completed a deal with the Briscoe Motor Corp., whereby it has purchased the property which Mr. Briscoe purchased last year, upon which was to be erected a new plant for the Briscoe company, also a number of workmen's homes.

MID-WEST TO DISCUSS ART

Chicago, May 31—Whether or not it is the sex appeal in body lines that makes the car beautiful is one of the subjects which W. B. Stout, of the Scripps-Booth Car Co., will bring up for discussion in his paper on "Art in Body Design" before the quarterly meeting of the Mid-West section of Society of Automobile Engineers Friday evening at the Chicago Automobile Club.

The second part of the program is a discussion of the problem in buying motor trucks to be led by a paper on the subject by Henry Farrington, of the Thomas B. Jeffery Co.

The section has arranged for special cars to take them and their friends to Detroit for the annual mid-summer cruise of the S. A. E.

Coffin Speaks on Value of Preparedness

Advocates Card Indexing of Factory Employees for Government Use in Urgent Cases

INDIANAPOLIS, Ind., May 30—Howard Coffin, who was a guest of the Indiana section of the Society of Automobile Engineers, at a preparedness dinner here Monday night, spoke of the work of the naval advisory board's committee on industrial preparedness of which he is the chairman. He outlined the importance of preparing the industry of this country for government work in case of war.

Mr. Coffin dealt with the card indexing system that the committee is preparing, in which every car factory together with the men it employs and the machinery is listed in such a way that the government knows exactly what work it should be counted upon to carry out in case of necessity. He spoke in favor of the Chamberlain bill and stated that its passage would clear the way for the organization of industry and would permit private individuals to assist the officers of the army and navy in putting the country in a state of preparedness in keeping with the non-militaristic condition of the country.

DENBY TRUCK PRICES REVISED

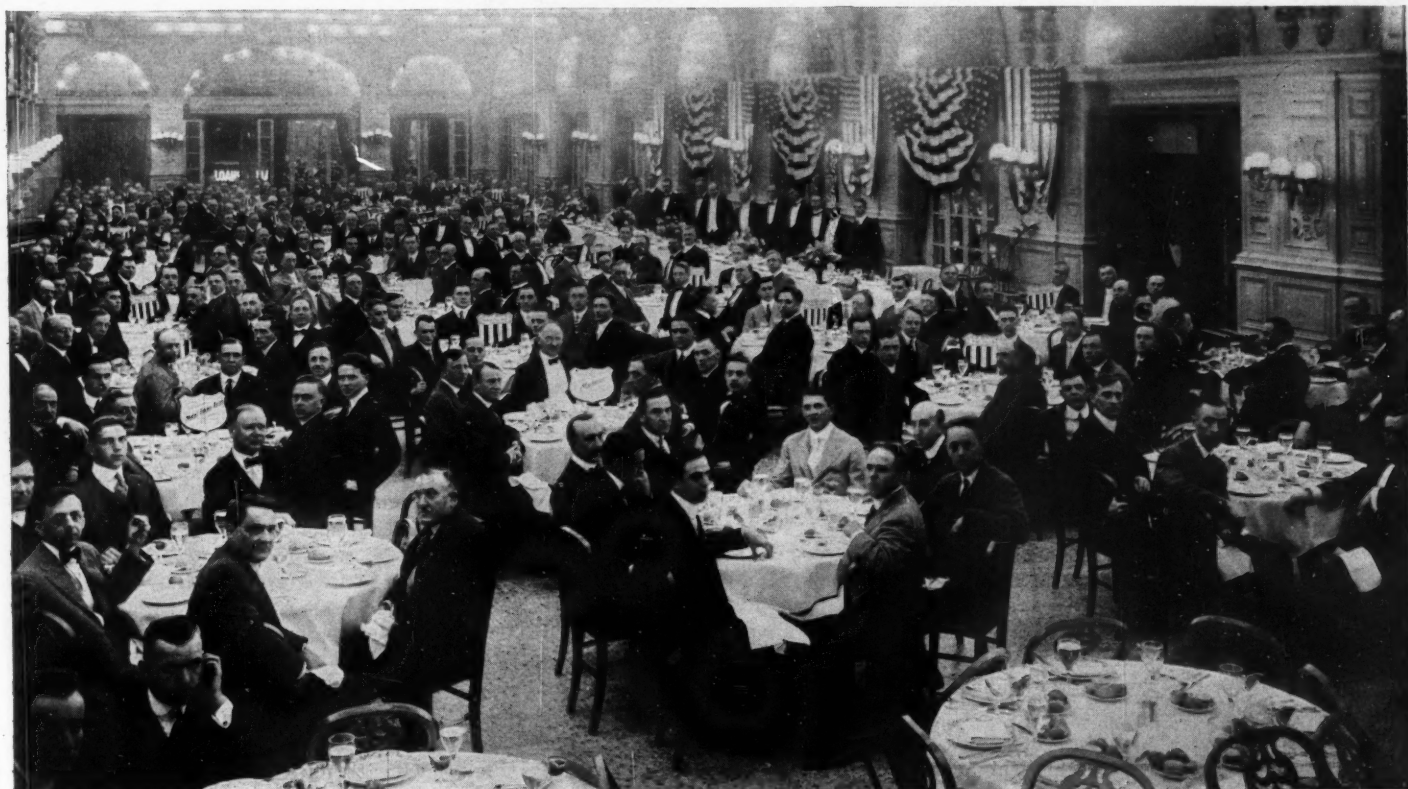
Detroit, Mich., May 29—The Denby Motor Truck Co. has revised the prices of its several models as follows: Type R, 1-ton capacity, \$1,020; type G, 1½-ton capacity, \$1,575; type H, 2-ton capacity, \$1,790; and type K, 2½-ton capacity,

\$2,090. It is explained that while these new prices seem higher, they are in reality little changed over the old figures, inasmuch as the Denby trucks have been underrated heretofore, and while they were amply able to carry larger loads, it is only now that they have been given a revised and greater load rating. The new prices, therefore, are simply commensurate with the added capacity. Of course, in making these changes in load ratings, certain alterations have been made in the chassis to take care of all contingencies with the heavier loads, making the vehicles in every sense capable of the work they do.

EASTERN GAS PRICES

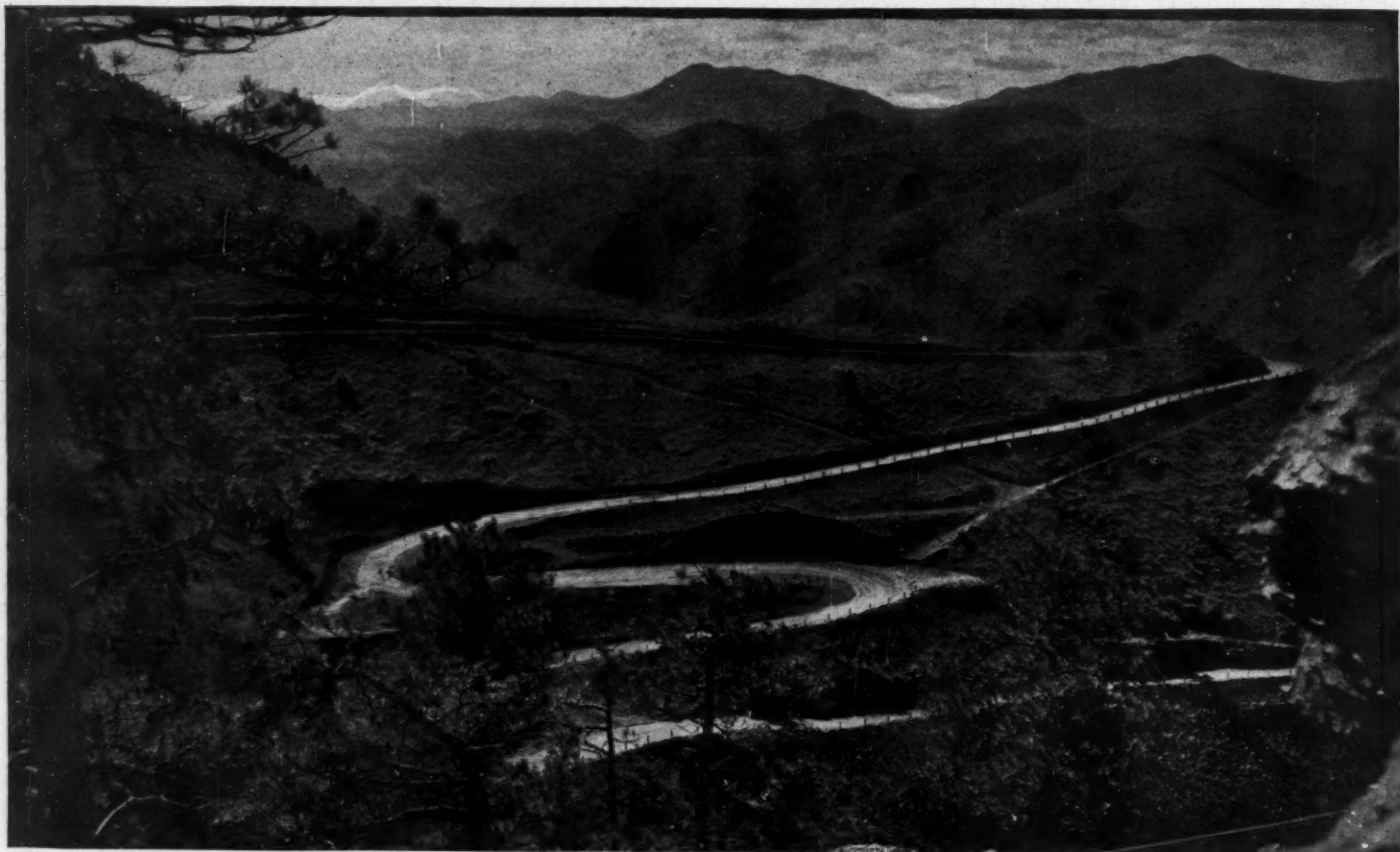
New York, May 29—Gasoline prices here continue unchanged. So far, dealers say, none of the large refineries have indicated their intention of advancing the wholesale charge, which continues at 24 cents a gallon in this city and 23 cents in New Jersey.

Retailers are asking from 27 to 31 cents a gallon. In New Jersey some of the dealers are selling at 24 cents a gallon. Oklahoma gasoline prices were reduced last week 2 cents a gallon to 23 cents tank wagon basis. The active season for gasoline is near at hand, and it is predicted that the chances for a downward revision in prices are not promising.



S. A. E. banqueters at Indianapolis on the evening before the sixth international sweepstakes race

What Colorado Does for the Motorist



In order to maintain a maximum grade of 6 per cent, the city of Denver made these loops in its roadway to the summits in its mountain parks

Denver's Mountain Park System Has Much to Offer Tourists in Way of Good Roads

EIGHTY THOUSAND motorists visited Colorado last year and left nearly \$10,000,000 in the state, according to figures recently prepared by Thomas J. Ehrhart, state highway commissioner. Mr. Ehrhart has been marshalling his figures to show that Colorado can well afford to be generous in the matter of highway building. The commissioner points out that a business which is worth a matter of \$10,000,000 a year is likewise worth being supported in generous fashion, so he is advocating largely increased expenditures by the counties as well as by the state highway department.

\$2,000,000 a Year for Roads

As matters stand, Colorado is spending more than \$2,000,000 a year on its roads. It has 14,000 miles of mountain highways which fully merit the term scenic. Altogether there are 31,000 miles of highways in the state, some of the best straightaway roads in the country being on the plains east of the Rocky Mountain range. Motor races on the plains, skirting the mountains, are annual events, and the 110 miles between Denver and Cheyenne have been the scene of many events in which high speed has been attained.

Denver is the motor hub of the Rocky

Mountain country. The Colorado capital is on the branch of the Lincoln highway which leaves the main trunk road at Big Spring, Neb. It is on the Midland Trail, and is only a short run to the north from the Santa Fe Trail. The establishment of the Denver-Yellowstone Park motor route has made Denver the mecca for those who would enter the Yellowstone by the Cody scenic gateway. A new route to the southwest, including the Grand Canyon and southern California, will be opened this summer in the scenic highway from Denver to Pagosa Springs, Durango and Mesa Verde National Park. This highway affords a new route across the Continental Divide. It extends from the southwest corner of Colorado to Denver in a direct line, and takes the traveler through an ideal hunting and fishing country all the way. Much of this road over the mountains has been cut through solid rock. At one point, where it follows the course of Wolf Creek, on the western side of the Continental Divide, it is 2,700 feet above the creek. It crosses the range at an altitude of more than 10,000 feet, yet its maximum grade is 8 per cent.

Though new and splendid highways are being constructed in all parts of the state,

Denver yields no whit in comparison with its own mountain park roads. Denver's mountain parks are unique in themselves. They begin at the edge of the foothills, 15 miles west of Denver, and extend to the top of Genesee mountain, 16 miles farther on. In a matter of 27 miles the motorist rises from an elevation of about 5,000 feet to a height of 8,700 feet above sea level, yet the roads are so perfectly constructed as to grades and curves that the weakest motors make the trip without difficulty. Two mountain tops are included in these wonderful municipal parks. The roadway through the parks vies with the natural scenery in attracting the admiration of the tourist. The road up Lookout Mountain cost \$11,000 a mile in some places. It affords unexcelled views of mountains and plains. On the curves the motorist is protected by a system of steel cables and stone parapets, making a serious accident impossible.

Bear Creek Canyon

From Lookout Mountain the motor road has been pushed on to Genesee Mountain, where the city has 1,000 acres in a natural park, with elk and buffalo roaming practically at liberty. On the return the motorist journeys through Bear Creek Cañon,

reaching Denver by a route quite different from that over which the start was made. The 70-mile trip through Denver's mountain parks, over municipally-owned and controlled highways, can be made in 8 hours from the city, giving ample leisure for the enjoyment of the scenery.

It cost Denver's taxpayers many thousands of dollars to buy these mountain parks and build highways thereto—a half million, to be exact—but the expense has been met cheerfully for the reason that Denver is finding that it pays to be good to Mr. Motorist. The state highway commissioner took a road census on the highway between Denver and Colorado Springs for 41 days last August and September, and in that time 10,390 cars were counted traveling between the two cities. Of this total, 3,482 cars bore the tags of visitors from other states. The highway commissioner did a little further estimating, and showed that the occupants of these visiting cars must be spending at least \$320,000 a day in Colorado. Because of these facts, Colorado's highway commissioner points out that the state can hardly overdo the matter of building and maintaining scenic highways. Last year Colorado voted an extra half-mill levy for road purposes, and this will be spent during the present season in the construction of new roads. One of the notable pieces of highway work that will be pushed is the Fall River road, through the newly-created Rocky Mountain National Park, 100 miles northwest of Denver. This highway will bisect the national park, from east to west, and will cross the Continental Divide, affording direct connection with Grand Lake, the largest body of water in Colorado. The government is co-operating in building this road. All the work has been done by honor convicts from the Colorado state penitentiary.

Four Routes to Estes

As an instance of the way in which a point of scenic interest will attract new volumes of motor travel, it may be pointed out that there are now four motor routes to Estes and Rocky Mountain National Park from Denver, whereas one road took care of all the travel to this playground a few years ago. All four of the routes are now crowded in summer, when travel to the new national scenic preserve is at its height.

Like California, Colorado is finding that a good scenic highway is the best kind of an investment. Nor is the question of maintenance so much of a problem in Colorado as in some other states, because much of the average mountain highway in the Rockies is on a granite base. The first cost of highway construction is much greater, but, inversely, there is a considerable saving in upkeep. In order to secure the best possible care of its roads, Colorado is now talking about a system of road patrols, similar to that in force in Germany and other European countries. Instead of leaving highway upkeep to the

whim of the roadside dweller, whose work is always desultory and generally unsatisfactory, it is proposed to establish a system of salaried patrolmen. The patrolmen shall have districts of from 8 to 12 miles of highway to care for, and shall be paid a salary of not less than \$100 per month per individual, during from 6 to 8 months of service. In this way it is believed the magnificent motor drives which radiate from Denver into the mountains will be given the most scrupulous care and will rival the best of German and French highways, of which so much is said by motorists who return from abroad.

It took the motor to open Colorado's scenery to the world. The highways that

now penetrate the Rockies in a hundred places west of Denver have opened new vistas of delight that were never glimpsed by travelers from train windows. Fortunately Colorado is proving alive to the situation and has not been niggardly in building new roads and improving old ones. As Colorado's highway commissioner says:

Good Roads on Investment

"Good roads are merely a form of business investment for a state that has scenery to sell. Colorado has scenery without limit, and it would be guilty of faulty business judgment if it failed to meet public demands so far as highway construction is concerned."

Answers to Route Information Inquiries

Circle Tour of East

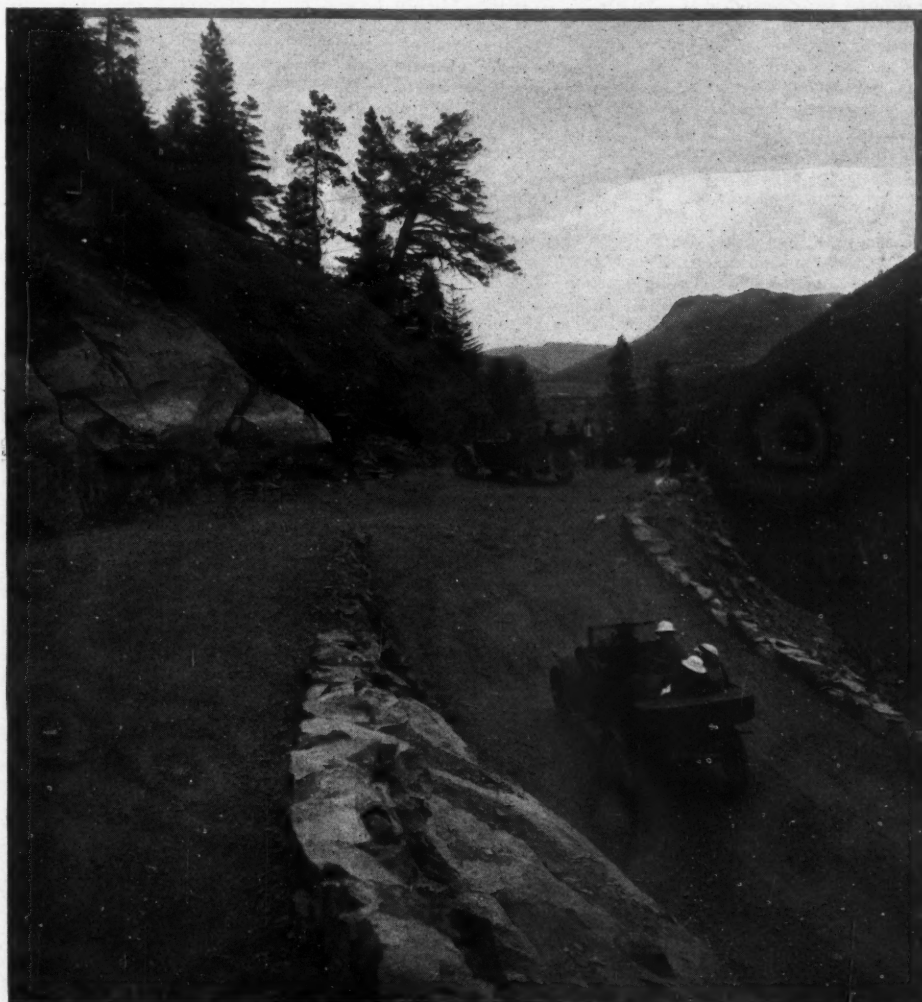
WEST LIBERTY, Ia.—Editor Motor Age—We are planning a motor trip through the East this summer and are in need of some information relative to the routes, etc. We are planning to leave West Liberty and wish to go to Springfield, Ill., on to Washington, D. C., New York, Albany, N. Y., Detroit, Mich., Chicago, and return home. Kindly give the best route to follow to make these points. Where would be the best place to write for the literature giving the points of interest along this route so that we may be able to see all the interesting points without too many side trips?

In passing over this route, crossing the several states necessary, will one encounter any trouble regarding state licenses, or will the home license carry one through? We expect to stop at hotels nights. How are the rates at hotels in the East compared with Iowa?

What will one be apt to pay for storing the car nights?

Is it within reason to expect to make this trip in 60 days and visit many points of interest? The railroad mileage figures about 2,500 miles.

Does Motor Age think that 100 miles a day would be too fatiguing? We have never



Scene of Fall river road through Rocky Mountain National Park

tried a long motor tour. We will drive a Buick touring car 6-55.

Is one correct to expect that under favorable conditions the roads along the intended trip will be generally good?—B. W. Rowlen.

In going to Springfield, Ill., you will probably find the best roads by going into Davenport, then crossing over to Rock Island, going south to Fredonia and Alpha to Galesburg. From here you go through Brimfield, into Peoria, then south through Delavan, Middletown, to Springfield. From Springfield to Washington, D. C., you go east through Decatur, Newman, Rockville, Indianapolis, Richmond, Dayton, Columbus, Newark, Dresden, Coshocton, Ulrichsville, Cadiz, Wheeling, Uniontown, Cumberland, Hagerstown, Frederick, to Washington. From Washington to New York the best direct route is to go up to Baltimore, Wilmington, Philadelphia, Trenton, New Brunswick, into New York. But you will find it a very nice trip by going from Philadelphia over to Atlantic City, then going north through Lakewood, Freehold, Perth Amboy, then into New York. From New York to Albany there is only one road to take; that is by going north through Dobbs Ferry, Tarrytown, Peekskill, Poughkeepsie, Hudson, to Albany, and then follow the heavily traveled route through Schenectady, Amsterdam, Fonda, Herkimer, Utica, Syracuse, Auburn, Geneva, Canandaigua, Batavia, into Buffalo. If you are not so very desirous of coming up to Albany and really desire a prettier trip back to Chicago and are not really anxious to go into Detroit, we would advise your going from Poughkeepsie over to Kingston, then to Phoenicia, up to Stamford, then over to Oneonta, then down through Unadilla, to Binghamton, Owego, Elmira, to Hornell. If you wish a little longer trip, but very beautiful, you can go from Owego up to Ithaca, over to Watkins and then down to Hornell. From Hornell you go through Olean, Jamestown, then up to Westfield, picking up the shore road through Erie and Cleveland into Toledo. Then go through Bryan, to South Bend, then to Chicago. However, if you are very desirous of going through both Buffalo and Detroit, I think you will find it a little bit better to either take the boat from Buffalo to Detroit or go up to Niagara Falls and go through Canada. The road from Toledo to Detroit is not very good.

From Chicago, your best routing is to go to Geneva, De Kalb, Rochelle, Dixon, Sterling, then down to Moline, Rock Island, Davenport, into West Liberty.

You are asking for literature giving the points of interest along the route. We not only advise procuring the Blue Book for complete road directions for your trip, but it also will give you a summary of the points of interest at the head of each route. It would be just the thing that you would wish for such a trip.

Each volume of the Blue Book gives a summary of the motor car laws of each state which you would go through, and there are very few instances where you would have to procure any new license. New Jersey, and Ontario, Canada, would be the only places where you might encounter difficulty. In New Jersey you cannot stay more than 15 days in a year without procuring a license, and in Ontario you would have to procure a new license.

You will find the rates for hotels and garages in the East practically the same as in Iowa. There is no reason why you cannot make this trip in 60 days, and we generally consider that 150 miles is the average mileage per day.

Chicago-Wichita, Kan.

Chicago.—Editor Motor Age—Kindly give the best route from Des Moines, Ia., to Madison, S. D., and from Madison, S. D., to Wichita, Kan.

2—Kindly give the approximate cost per person for wear and tear, gas, oil and tires. The car is a five-passenger Buick 6-D-45, weight 2885. I get 22 miles to the gallon of gas on straight country roads, use 33 by 4 non-skid tires.—E. Schuler.

In going from Des Moines, we advise you to go to Dallas Center, then north through Ogden to Fort Dodge. Then continue northwest through Clare, Unique, Plover to Emmetsburg. Then go west through Spencer, Sheldon, Rock Valley, Canton, Sioux Falls, Hartford, Lyons, Chester, Wentworth, to Madison.

From Madison to Wichita, go south to Salem, then through Bridgewater, Yankton, Pierce, Norfolk, Columbus, Shelby, York, Geneva, Belvidere, Bellville, Concordia, Glasco, Minneapolis, Salina, McPherson, Newton, to Wichita.

It is impossible to give you the cost per passenger for wear and tear in the general

running of your car, because this depends altogether on how you drive your car and over what kind of roads you are going.

Volume 5 of the Blue Book will give you complete routing for the entire trip.

Ballinger, Tex.—Anadarko, Okla.

Ballinger, Tex.—Editor Motor Age—Kindly give the best route from Ballinger, Tex., to Anadarko, Okla., via Jacksboro, Tex.—J. E. Brewer.

In going from Ballinger to Anadarko through Jacksboro, we advise you to go through Winters, Bradshaw, Guion, Buffalo Gap, Abilene, Putnam, Ranger, Strawn, Gordon, Palo Pinto, and Mineral Wells, then north through Salesville and Perrin to Jacksboro.

From Jacksboro, go up to Wichita Falls, either via Archer City or Henrietta for which you had better make local inquiry.

From Wichita Falls go north through Burkburnett, Randlett, Lawton, Apache, Stecker, into Anadarko.

Ennis, Tex.—Detroit, Mich.

Ennis, Texas.—Editor Motor Age—I am contemplating a trip to Detroit, Mich., in July and wish to go through Ft. Wayne, Ind., and Montpelier, O. Kindly give the best route, and advise where we can secure maps of the different states.—W. E. Spellman.

On your trip north we advise that you go through Ferris, Hutchins, into Dallas. From Dallas, the following routing may seem a little too long for you, but in reality it is only about 150 miles longer than the direct route and the road conditions are much better.

We advise you to go from Dallas to Ft. Worth, then to Bowie, Wichita Falls, Lawton, Anadarko, El Reno, Enid, Valdwel, Wellington, Wichita, Newton, Florence, Emporia, Ottawa, Kansas City. Then through Independence, Lexington, Grand Pass, Marshall, Boonville, Columbia, Mexico, Louisiana, Pittsfield, Winchester, Jacksonville, Springfield, Decatur, Champion, Danville, Covington, Attica, La Fayette, Logansport, Peru, Wabash, Huntington, Ft. Wayne, Hicksville, Bryan, then to Montpelier.

From Montpelier to Detroit, the best routing is to come back to Bryan, then go through Stryker, Archbold, Wauseon, then north through Seward, Jasper, Adrian, Clinton, Saline, Ypsilanti, to Detroit.

Volumes 5 and 4 of the Blue Book will give you a complete routing for this trip. Price \$2.50 each. These books can be obtained of the Automobile Blue Book Publishing Co., Mallery Bldg., Chicago, Ill.

Dallas, Tex.—San Angelo, Tex.

Stamps, Ark.—Editor Motor Age—Kindly give the best route from Dallas, Tex., to San Angelo, Tex.

2—What would be the mileage from Shreveport, La., to San Angelo, Tex., routing via Tyler and Dallas, Tex. Give the road condition from Shreveport to San Angelo during summer months.

3—What is the mileage from Little Rock, Ark., to Forest, Ill., routing via Forrest City and Jonesboro, Ark., and St. Louis?

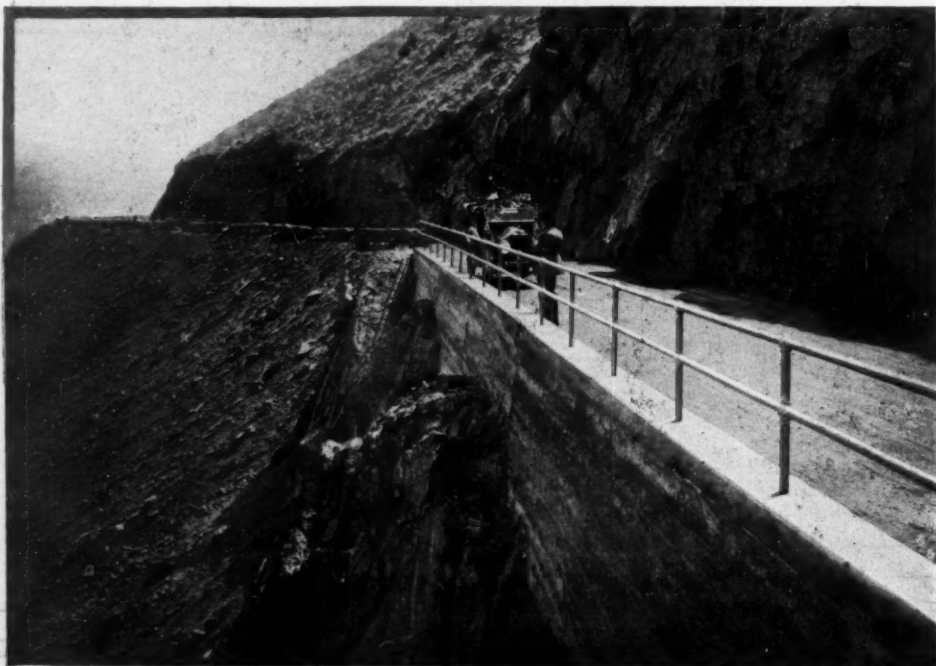
4—Give the mileage from Little Rock to Forest, routing via Memphis.

5—Which of these routes would be the best for travel during summer months?—A. Subscriber.

1—In going from Dallas, Tex., to San Angelo, we advise that you go through Fort Worth, Weatherford, Mineral Wells, Palo Pinto, Gordon, Strawn, Ranger, Putnam, Abilene, Buffalo Gap, Bradshaw, Winters, Ballinger, Rowena, Miles, Harriet, into San Angelo.

There is a dirt road between these two towns and in dry weather it is very good, but in wet weather you would have difficulty in getting through. The mileage is about 330 miles.

2—From Shreveport to Dallas, you go



Masonry work on one of Denver's mountain park roads

through Greenwood, Longview, Gladewater, Starville, Winona, Tyler, Edon, Willis Point. The mileage is about 200 miles.

3—In going to Forest, Ill., from Little Rock your best routing is to go to Clarendon, Forrest City, Jonesboro, Marmaduke, Piggott, Campbell, Dexter, Agulla, Cape Girardeau, Jackson, Perryville, St. Genevieve, Bonne Terre, De Soto, to St. Louis, then go over to E. St. Louis on to Litchfield, Springfield, Bloomington, Towanda, Lexington, Chenoa, and east to Forest. The mileage this way is about 700 miles.

4—The routing by way of Memphis is just about the same distance. From Memphis you go through Brownsville, then up to Union City, Jordan, Cairo, Murphysboro, then to St. Louis.

Creston, Ia.—Madison, Wis.

Creston, Ia.—Editor Motor Age—Kindly give the best route from Creston, Ia., to Madison, Wis.—C. J. Atkinson.

On your trip to Madison, your best routing is go east through Talmadge, Osceola, Woodburn, Chariton, Georgetown, Albia, Ottumwa, Fairfield, Washington, Columbus City, Columbus Jct., Muscatine, Davenport, Clinton, Mt. Carroll, Lanark, Freeport, Monroe, Evansville, Oregon, to Madison.

Volumes 5 and 4 of the Blue Book will give you a complete routing for this trip.

Conway, Ark.—Pittsburg, Tex.

Conway, Ark.—Editor Motor Age—Kindly send us maps of Arkansas and Texas. Also kindly give the best route between Conway, Ark., and Pittsburg, Tex. If you cannot furnish these maps, will appreciate if you will advise us where we could get them.—W. M. Harrell & Co.

In going from Conway, Ark., to Pittsburg, Tex., we advise that you go down to Little Rock, then go through Collegeville, Benton, Hot Springs, Bismark, Arkadelphia, Prescott, Emmet, Hope, Fulton, Homan, Mandeville, Texarkana, New Boston, DeKalb, Avery, Clarksville. From Clarksville, go south through Mt. Pleasant to Pittsburg.

Selma, Ark.—Starkville, Miss.

Starkville, Miss.—Editor Motor Age—Kindly give the best route from Selma, Ala., to Starkville, Miss. Would it be better to go via Demopolis, Livingston, Gainesville, Ala., and Macon, Miss., or by Maplesville, Tuscaloosa, Ala., and Columbus, Miss.?—S. Blumenfeld.

Your best routing from Selma, to Starkville is to go west through Beloit, Orrville, Safford, Uniontown, Demopolis, Costopa, Livingston, York, Cuba, Meridian, then go north through DeKalb, Macon and Artesia, and then west to Starkville.

Volume 6 of the Automobile Blue Book will give you a complete routing for this trip, and we advise that you procure same and look through it to see the number of options over good roads that are given.

Twin Valley, Minn.—Medicine Lake, Mont.

Twin Valley, Minn.—Editor Motor Age—Kindly give the shortest and best way to arrive from Twin Valley, Minn., to Medicine Lake, Mont.

2—Where can we secure a map giving the towns along the road for about 25 cents?—F. R. Johnson.

On your trip to Medicine Lake, Mont., we advise your coming down to Moorhead, then going over to Fargo, and follow the National Parks Highway through Casselton, Valley City, Jamestown, Dawson, McKenzie, Bismarck, New Salem, Hebron, Taylor, Dickinson, Bealefield, Medora, Sentinel Butte, Beach. Then from Beach drive through Wibaux to Glendive. Here you go north following the Northern Pacific Railroad through Intake, Savage, Sidney, Mondak, Snoden, Bainville, then west to Culbertson, where you turn north through Froid to Medicine Lake.

Volume 5 of the Automobile Blue Book will give you the routing from Moorhead to Glendive. Price, \$2.50.

2—We know of nothing that you can procure for 25 cents. Even if it were possible, the low price would make us suspicious of its accuracy.

Sioux City, Ia.—Williamsburg, Pa.

Sioux City, Ia.—Editor Motor Age—Kindly give the best route from Sioux City, Ia., to Williamsburg, Pa., via Evanston, Ill. Which is considered the better route, through Iowa, the Hawkeye Highway or the Lincoln Highway, from Sioux City?—W. J. Braskamp.

On your way east to Evanston, your best routing is to go down through Smithland, Denison, then follow the Lincoln Highway through Carroll, Jefferson, Grand Junction, Boone, Ames, Marshalltown, Tama, Belle Plaine, Cedar Rapids, Marion, Clarence, De Witt, Clinton, Sterling, Dixon, Rochelle, DeKalb, Geneva, Lombard, into Chicago, then go north to Evanston.

In going from Evanston to Williamsburg, Pa., we advise that you go through the following towns: Chicago, Valparaiso, LaPorte, South Bend, Goshen, Bryan, Wauseon, Toledo, Fremont, Bellevue, Norwalk, Oberlin, Elyria, Cleveland, Akron, Alliance, Salem, Beaver Falls, Pittsburgh, Indiana, Altoona, into Williamsburg.

Volumes 5, 4 and 3 of the Automobile Blue Book will give you a complete routing for this trip.

Kansas City, Mo.—Portland, Ore.

Springfield, Ore.—Editor Motor Age—Kindly give the best route from Kansas City, Mo., to Portland, Ore.—R. L. Kirk.

In going from Kansas City to Portland, Ore., there are two direct ways which you can take. One is to go from Kansas City over to Hiawatha, Lincoln, Grand Island, North Platte, Big Springs, Kimball, Cheyenne, Laramie, Rawlins, Rock Springs, Granger, Evanston, Ogden, Brigham, Snowville, Albion, Twin Falls, Mountain Home, Boise, Caldwell, Weiser, Baker City, LaGrande, Pendleton, Heppner, The Dalles, into Portland.

The other routing is to go from Kansas City along the Santa Fe trail through Emporia, Florence, Hutchinson, Dodge City, Garden City, Syracuse, La Junta, Pueblo, and then either go up to Colorado Springs, then to Buena Vista, or from Pueblo go to Salida, then up to Buena Vista, or you can go from Salida to Saugache and Montrose, then to Grand Junction, or you can go from Buena Vista through Glenwood Springs into Grand Junction, then up to Salt Lake City and Ogden, taking up the former routing, or again you can go from Kansas City through Topeka, Manhattan, Clay Center, Concordia, Beloit, Colby, into Limon. From Limon you can go down to Colorado Springs, Buena Vista, then to Grand Junction, or up through Denver, Cheyenne and across that way or from Denver over to Grand Junction.

We would advise you procuring Volume 5 of the Automobile Blue Book. This will give you complete running directions for your entire trip with all these various options.

Winnfield, La.—Humboldt, Tenn.

Winnfield, La.—Editor Motor Age—Kindly give the best route from Winnfield, La., to Humboldt, Tenn., via Memphis.

Also kindly give the best route from Shreveport, La., to Memphis, Tenn.—J. M. La Grarie.

In going from Winnfield to Humboldt, Tenn., your best routing is to go north through Ruston, Farmerville, Hillsboro, El Dorado, Hampton, Chambersville, Fordyce, Rison, Pine Bluff, Little Rock, Lonoke, Clarendon, Brinkley, Forrest City, Memphis, Brownsville, Jackson, then up to Humboldt.

Chicago-San Francisco

Chicago—Editor Motor Age—I am contemplating a trip from Chicago to San Francisco via Denver and Salt Lake City, leaving about

September 1. Is this too late in the year to negotiate the trip through the Rockies in comfort?—G. W. Webster, Jr.

Leaving Chicago about September 1 will get you in the Rockies a little too late for the average season. Although in case we have a late summer and the warm weather lasts late in the year, you will have no trouble in making the trip. However, it may be advisable if you could leave about seven days sooner. In going to San Francisco through Denver you will probably find the most satisfactory routing to go up to Davenport, Des Moines, Omaha, Grand Island, North Platte, Julesburg, Sterling, Fort Morgan, Greeley, Denver, down to Colorado Springs, then to Buena Vista, Glenwood Springs, Grand Junction, Salt Lake City, then follow the Wendover Cut-off to Cobre, then the north road through Elko, Winnemucca, Lovelock, Reno, around Carson City and over to Lake Tahoe, then over to Sacramento and down to San Francisco.

Volume 5 of the Automobile Blue Book will give you a complete routing for this trip, and we advise that you procure same and look through it to see the number of options over good roads to the Coast.

Waubay, S. D.—Yellowstone Park

Waubay, S. D.—Editor Motor Age—Kindly give a route from Waubay, S. D., to Black Hills, S. D., and from there to Yellowstone Park, Glacier National Park.—W. L. Nelson.

In going to Black Hills, S. D., and Yellowstone Park and Glacier National Park we advise that you go down to Huron, then west through Miller, Pierre, Ottumwa, Cottonwood, Wall, Rapid City, Deadwood, Lead, Gillette, Buffalo, Ten Sleep, Basin, Cody, and then into the Park. From the Park go north to Livingston, then west through Bozeman, Logan, Butte, Anaconda, Drummond, Missoula, then north through St. Ignatius to Kalispell, then up to Glacier National Park.

You will find road conditions better if you follow the Yellowstone trail out of Waubay over to Billings, then down to Cody, and into the Park. This is a little bit longer and you might prefer to use this as a return option.

Volume 5 of the Automobile Blue Book will give you complete running directions either way and we advise you to procure same.

Quincy, Ill.—Monte Vista, Colo.

Quincy, Ill.—Editor Motor Age—Kindly give the best route from Quincy to Monte Vista, Colo.—R. Wisman.

In going from Quincy, Ill., to Monte Vista, Colo., your best routing is to go down through Hannibal, New London, Perry, Mexico, Columbia, New Franklin, Boonville, Marshall, Grand Pass, Lexington, Independence, into Kansas City.

From here you go over the Santa Fe Trail through Olathe, Edgerton, Ottawa, Waverly, Elmdale, Florence, Newton, Hutchinson, Lyons, Ellinwood, Great Bend, Larned, Kinsley, Dodge City, Cimarron, Garden City, Lak-in, Syracuse, Coolidge, Lamar, Las Animas, LaJunta, to Pueblo. From Pueblo into Monte Vista there are two ways of going. You can either go to Canon City, Salida, and Saguache and down to Monte Vista, or you can go from Pueblo down to Walsenburg and then through Alamosa into Monte Vista.

Shawnee, Okla.—Aurora, Mo.

Earlsboro, Okla.—Editor Motor Age—Kindly give the best route from Shawnee, Okla., to Aurora, Mo., and give the distance.—C. F. Alfrey.

I think you will find your best routing from Shawnee to Aurora by going up through Meeker, Payson, Sparks, Davenport, Milfay, Bristow, Heyburn, Sapulpa, Tulsa, Collinsville, Oologah, Nowata, Delaware, Elliott, Coffeyville, then east through Kings, Edna, Cecil, Chetopa, Melrose, Keelville, Baxter Springs, Lowell and Joplin, then to Aurora.



The Motor Car Repair Shop



Electric System Troubles and Their Remedies—Part I

This is the first of a series of articles on the care of the electrical system. Other installments will follow and all phases of this important subject will be gone into that the car owner may acquaint himself with the starting, lighting and ignition of his car to make many repairs for himself.

BECAUSE of the fact that the average motorist is not of an electrical turn of mind, he seems to have more trouble locating and remedying slight faults in the electric system of his car than he does with any other part of the machine. Most electrical matters appear to be Chinese puzzles to him, and the mere thought of groping among the mysterious wires and instruments that the hood and dash conceal is enough to cause him to seek the repair man at once, even though some very simple thing in reality might be the trouble.

Like any other feature of the machine, the more the owner knows concerning the electric system the better off he is, for he can diagnose the troubles that are sooner or later inevitable, and can better guard against difficulties through intelligent care. The first thing to do is to get clearly in mind just what the function of each unit is, understand how it operates and what it controls, and figure out the wiring through careful perusal of the instruction book and wiring diagram that come with the machine. After carefully doing this, if you still cannot understand all the features of the system, either write the car maker, the builder of the electric apparatus or write *Motor Age*. Having clearly in mind just what each thing is for, you will be surprised how readily you will determine when anything is wrong, and why it does not operate as it should.

Locating Troubles

Locating troubles in electric starting and lighting systems is largely a matter of eliminating one thing after another as the cause, and then reasoning out what unit in the part you have finally located as being defective is not functioning as it should, thus resulting in the symptoms of the case.

In a general way, the starting circuit and the lighting and ignition circuits are all separate insofar as a broad consideration is concerned, and thus when one system operates as it should while another does not you immediately eliminate the former and pay attention only to the apparatus and wiring that is essential to the latter. If trouble develops with the ignition system, it is not necessary to take any notice either of the starting or the lighting apparatus, but merely confine the attention to the spark plug wiring, the distributor, timer, etc.

As the ignition is not always a part of the same electric system anyway, we will

devote our consideration of the electric apparatus to the two main subdivisions; namely, the starting circuits and the lighting circuits, taking up the troubles in each separately.

Faults in the Lighting System

Several things can result from troubles in the lighting circuit. The lights might be very dim or go out when the engine is running; they might do either of these things when the engine is not running; they might vary in intensity of light or flicker; some might be dim or bright, while others are out.

Taking up these possible conditions in order we may proceed to fix upon the several things that might cause the lights to get dim or go out when the engine is operating. This condition could result from a short circuit in the wiring or one of the instruments or lamps, or from a short circuit within the storage battery itself. Trouble in the generator also is a possibility, as is some form of open circuit. The easiest of these possible causes to look for is the short circuit in the wiring or apparatus, and if the trouble is not found here, it is necessary to delve deeper. Shorts in the connections at the lamps may be due to non-insulated wires touching one another, due to having become chafed or improperly taped, or otherwise insulated when attached. The wire usually being of the stranded type, a loose strand might be found to have bridged across the terminals to form a short circuit, a small thing in itself but important in its troublesome results. Defective or grounded lamp sockets are sometimes the cause of shorts of this kind, though the possibilities of such are more remote than some of the other causes. If the insulation is not what it should be and the socket touches the metal reflector, the short results. There should not be any bare wires anywhere. Sooner or later they cause trouble, and you should see that everything is as it should be at the lamps, with only the very terminal of the wire uninsulated where it connects to the lamp binding post.

Next look at the connections at the switches, for similar causes of short circuits are to be found at these points also. See that the insulation is as it should be and that there are no stray strands of wire hanging around to get into mischief at some future time even if they are behaving themselves at present. Sometimes

a switch gets grounded due to ineffective or improper insulation. Usually such defective parts have to be replaced, as there is no remedy for their malady. If a wire is allowed to rub against a sharp metal edge, it sooner or later has its insulation chafed off to such an extent that there is contact with some metallic part of the car, and a ground is the immediate result, usually forming a short circuit that depletes the battery.

Grease and water do their part in making the insulation defective or rotten, and when a wire is discovered to be in this defective condition it should be replaced before an annoying trouble develops. Sometimes when wires are supported in metal brackets or cleats the constant chafing wears off the insulation and the metal comes in contact—result, a short circuit.

Short Circuits

Battery short circuits are either internal and the result of defects in the unit itself, or they are due to external causes. Internal shorts arise from improper battery care resulting primarily from not keeping enough water in it to properly cover the plates, this making the plates warp and buckle and eventually short circuit. Such warping and improper care also is conducive to disintegration of the plates and the collection of sediment in the bottom of the jar, which in time collects to such an extent that it touches the bottoms of the plates and shorts them. You may not believe it, but spilling and slopping of the electrolyte can quickly cause an external battery short. If the solution wets the top of the battery, there is a chance for current leakage between the terminals, and sulphation is bound to result before long, this making a short or spoiling the connection between wire and terminal. This should immediately be dried off when there is spillage, and the terminals greased with petroleum jelly to prevent recurrence of the corrosion. Sometimes a short has resulted from the battery terminals being too close to the top of the metal battery container, this forming an electrical path from one battery post to another. This can be remedied by fitting a piece of wood or fiber into the under side of the metal container.

The circuit breaker is another unit in which a short circuit might be possible, supposing that you have gone over the points enumerated above without discov-

ering any cause of current leakage. Dirty contact points in this apparatus or other defects such as wornout contact mechanism are usually not easily remedied, and in such cases of shorting the instrument should be sent back to its maker for repair. Sometimes the contact points are held closed, this making a dead short on the battery through the generator. It does not take long for such a trouble to run the battery down, and if such is found to be the trouble one of the battery lead wires should be disconnected at once to save whatever of the battery's energy you can.

Usually a short will result from having reversed the connection of the battery and that from the generator, this resulting from carelessness in replacing the wires after they have been disconnected for some purpose. Always be careful to put the right wire back on the right terminal to avoid such mishaps. Occasionally the engine backfires and runs several revolutions in the reverse direction before it stops. This might result in the sticking of the circuit breaker points, and is indicated by the ammeter pointing to extreme discharge, indicating that the battery is shorted through the generator, as explained above. Such is only a remote possibility, however.

A short circuit might also be caused by the generator being grounded, due either to defective insulation in the armature or field windings, or to an accumulation of dust from the brushes in the lower part of the generator case forming a short between the brush holders.

Next week we will diagnose the electric troubles further and pass on to other units, taking up the starting circuit after having gone through the entire lighting circuit. For the method of procedure in carrying out the examination of the electric system, unit by unit, Motor Age is indebted to the Electric Auto-Lite Co.

Back-Firing Into Carbureter

The cause of back-firing through the inlet valve is generally a delayed combustion

of a weak mixture. The result of such a mixture is a weak explosion or slow burning of the charge. The fresh charge will therefore be ignited by the flame of the previous charge; and, as the inlet valve at that time is open toward the air supply pipe or passage, an explosion will occur in either the intake pipes or the carbureter. The remedy is of course to increase the fuel supply or to decrease the air supply. Explosions in the carbureter may also be caused by an inlet valve failing to close, thus permitting the mixture in the cylinders to ignite that in the inlet pipes and the carbureter.

Reader Has Air-Drawing Device

Paducah, Ky.—Editor Motor Age—Every repair man finds that it takes as much of his time to roll the wind out of a tube as it does to repair the puncture. This condition set me to thinking, as I have from fifteen to twenty-five tubes a day to roll up and put on the rack, which you can readily see, will take quite a while, or to be exact, it takes 2 minutes to roll up a 3½-inch tube and put it on the shelf, using the match method, or taking out the core: one is as fast as the other.

During spare time I rigged up the following device, which I call my "wind jerker." My vacuum tank I found at the junk shop for 75 cents. It is about a 30-gallon regular hot water tank used on most cook-stoves and can be had at most any junk shop. I next got a junk Ford rear wheel with a rear axle, also junk, twenty feet of 1½-inch leather belt, \$3. Two globe valves, \$1.50, and 20 feet of ¼-inch gas pipe, an old bicycle pump at the local bicycle store, \$2, and an old air valve used for inflating tires.

I rigged up this assortment of junk and I have a system that will jerk the wind out of a tube, leaving it as flat as a pancake. You can roll it up and have it on the shelf from a fully inflated tube in 50 seconds and really enjoy what used to be a hard job, doing it in less than half the time and with much less than half the labor and have a much better job.—E. J. Sears.

repairing all parts of all types of gasoline cars. This is a reference work for anyone engaged in the repairing of cars and the best idea of its contents is given in the following condensed synopsis

Outlines every process incidental to motor car restoration. Gives plans for workshop construction, suggestions for equipment, power needed, machinery and tools necessary to carry on business successfully. Tells how to overhaul and repair all parts of all automobiles. The information given is founded on practical experience, everything is explained so simply that motorists and students can acquire a full working knowledge of automobile repairing. Other works dealing with repairing cover only certain parts of the car—this work starts with the engine, then considers carburetion, ignition, cooling and lubrication systems. The clutch, change speed gearing and transmission system are considered in detail. Contains instructions for repairing all types of axles, steering gears and other chassis parts. Many tables, short cuts in figuring and rules of practice are given for the mechanic. Explains fully valve and magneto timing, "tuning" engines, systematic location of trouble, repair of ball and roller bearing, shop kinks, first aid to injured and a multitude of subjects of interest to all in the garage and repair business. All illustrations are especially made for this book, and are actual photographs or reproductions of engineering drawings.

Students as well as repairmen should find this a handy work, as it is treated in a non-technical manner. Published by Norman W. Henry Pub. Co., New York. Over 1,000 pages 5 x 8 with 1,000 specially-made engravings, cloth bindings, price \$3.

Light Car Handbook

The publishing house of Iliffe & Sons, Ltd., 20 Tudor St., London, E. C., England, in addition to producing the Auto-car and several other British trade papers, also is responsible for a number of books on motor subjects. The latest addition to its library is the Light Car Handbook which has been produced for the instruction of owners of small cars. Although written with particular regard to a class of machine practically unknown in America, the book contains very clear explanations of a great many things applying to cars of every size.

It is profusely illustrated and contains very good instructions concerning care of the various parts of a car. It is a book which the earnest student of motor cars would be interested in possessing. The publishing price is 36 cents or 48 cents prepaid.

A-B-C of Automobile Driving

Useful hints on driving a motor car under ordinary conditions or in unusual circumstances are given in the A-B-C of Automobile Driving, by A. Hyatt Verrill, published by Harper & Bros., New York. The book is one of Harper's A-B-C series. The importance of routine in handling and caring for the car and in getting ready for making trips, examining the gasoline supply, inspecting the lubricator and grease cups, attending to the supply of water for the radiator, taking all proper precautions every time the car is driven, is made strong early in the book. Likewise, the forming of correct habits in the actual driving of the car is emphasized and the way of cultivating them from the first day one takes hold of the wheel explained. Some valuable suggestions on how to get out of difficulties are given.

The Motorists' Bookman

MODERN Starting, Lighting and Ignition Systems, by Victor Page—A study of the construction and repair of up-to-date motor car electricity. In this work is included a full set of instructions for the repair and care of storage batteries, generators, regulating devices, starting motors, etc. The systems representing various classes of practice are described in detail and illustrated by complete diagrams showing the connections and the relations of the various parts of the assembly to each other. Data for the location of trouble in the various systems is given and there is also included a description of

the various accessories which are operated from current supplied by the storage battery.

In the present state of uncertainty among non-technical owners and those not familiar with the principles of electricity this work should fill a useful purpose. Published by Norman W. Henley Pub. Co., New York. Over 500 5½ x 8 pages with nearly 300 engravings and folding plates. Cloth binding, price \$1.50.

Automobile Repairing Made Easy, by Victor W. Page—Deals with shop methods, equipment and processes and is a complete treatise explaining approved methods of



The Readers' Clearing House

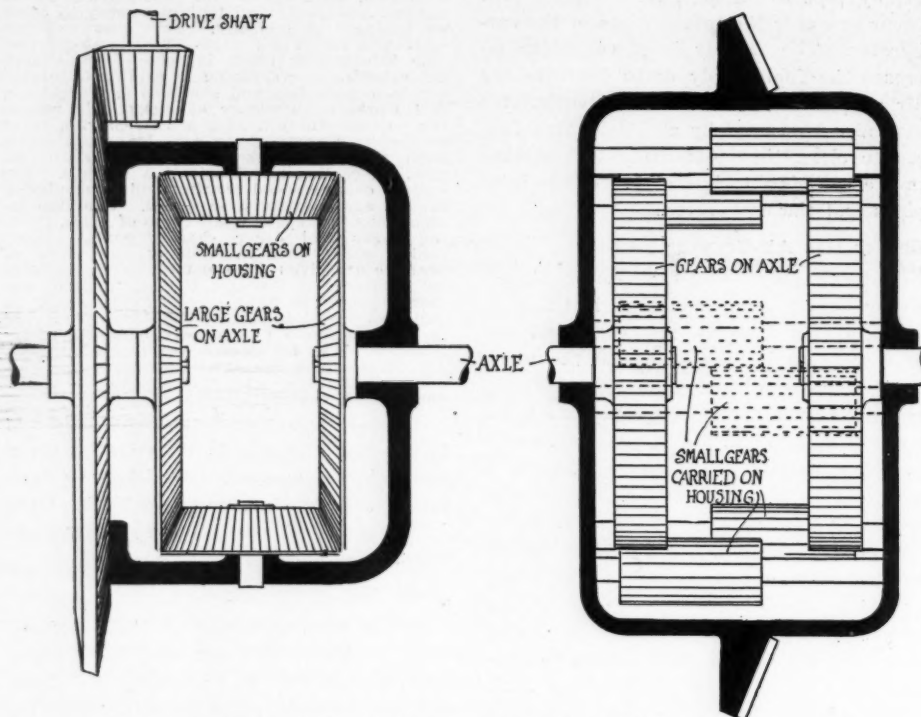


Fig. 1—Showing how two types of spur-gear differentials differ

EXPLAIN SPUR-GEAR DIFFERENTIAL

Difference Between Two Types Shown in Accompanying Diagram

ECKMAN, N. Dak.—Editor Motor Age—Wherein does the spur-gear differential on the 1911 Winton Six differ from the type generally used? If there is a difference, explain and illustrate by diagram.

2—Will cold air drawn into a gas-engine cylinder produce more power than hot air? My reason for asking this is, that cold air when heated expands more than hot air; therefore, I should think cold air would produce more power than hot air.—John L. Becker.

1—The old Winton differential differs from the most commonly used bevel-gear type in that the axles carry spur instead of bevel gears, these being in mesh with other spur gears, long and of small diameter. The small gears are in pairs as shown in the accompanying figure, being in mesh with each other at their inner ends, and each member of a pair meshing with one of the axle gears. The small gears revolve on studs supported by the housing that is revolved by the ring gear, the studs in this case being parallel with the axle instead of at right angles to it, as are the studs in the bevel-gear type. Diagrams of comparison of the two types are shown in Fig. 1.

2—Yes, providing there is perfect combustion with the cold air. With present fuels it usually is not perfect.

SEEKS DATA ON WEIDELY MOTOR

Used in 1916 Production of Pathfinder and H. A. L. Cars

Oklahoma City, Okla.—Editor Motor Age—Was the Weidely motor a success.

2—If it was what are its distinguishing features?

3—In what cars is it used now? Is it a T

or L-head type of motor?—W. O. Seitz.

1—Yes.

2—Valves in the cylinder head, single camshaft, in the V between the two sets of cylinders, all valve parts operate in oil, aluminum-alloy pistons, tubular connecting-rods, counterbalanced crankshaft.

3—Pathfinder and H. A. L. It is neither a T nor an L-head motor. The valves are overhead.

FORD RACER FOR CUBAN CONTESTS

Changes Suggested Should Materially Increase Speed of Car

Matanzas, Cuba.—Editor Motor Age—I would thank you very much to answer the following questions: Motor car races are now

being organized in Cuba and I want to equip a Ford for racing.

1—The point is to equip a Ford, model T, 1915, with the following devices: Would you be kind enough to tell me if this would give more strength and speed? Elsemann magneto; special Ford gearing for racing; ratio, 2 4/7 to 1; a Brown tank sub-base oiler; a Zenith carburetor, special for Ford; a set of wire wheels, aluminum alloy pistons; a radiator of the universal type.

2—The most important point for me is what follows: I wish you would look into this carefully and tell me whether it can give more strength or not, or what damage it might do. According to the Ford catalog, the following parts are to be taken out, part number 3276-B and 3277. Now what I wish to do is to put a new flywheel, number 3269-C, on top of the one that stays in the Ford, or in other words as it is in number 3300 in the catalog; this is without the dynamo. On top of this another one is supposed to be put, or two flywheels joined together. It is understood that, to do this operation, the flywheel has to be cut out or better said perforated, or a circle of 1/4 inch, approximately, in the flywheel where the screws are secured. As far as I can see, putting in the racing gears and adding another flywheel will keep up for me the same strength as before with the common equipment that the Ford carries.

3—Also please let me know if you know of anyone who manufactures any exhaust pipe like that shown in Motor Age of Nov. 25, 1915, as I want to buy the four as shown in cut 2 on page 42.

1—There is no reason why such equipment added to your Ford car should not materially increase the speed.

2—Your description of the alterations you plan on making are rather vague, but if we understand it correctly, you intend to remove the magneto and substitute in its place an extra flywheel to keep the motor properly balanced. The change would require careful machine work to avoid throwing the motor out of balance. Such an arrangement properly installed, should be perfectly practical.

3—We know of no one who manufactures such pipes for Ford cars. The design was merely a reader's suggestion. You could very easily have such pipes bent up from the proper size tubing.

Hudson Crankshaft Dimensions

Geraldine, Mont.—Editor Motor Age—Is the Herz magneto still manufactured? If so, where?

2—Will Motor Age please give me wiring diagram for Metz 22 with Gray & Davis single unit starting and lighting system?

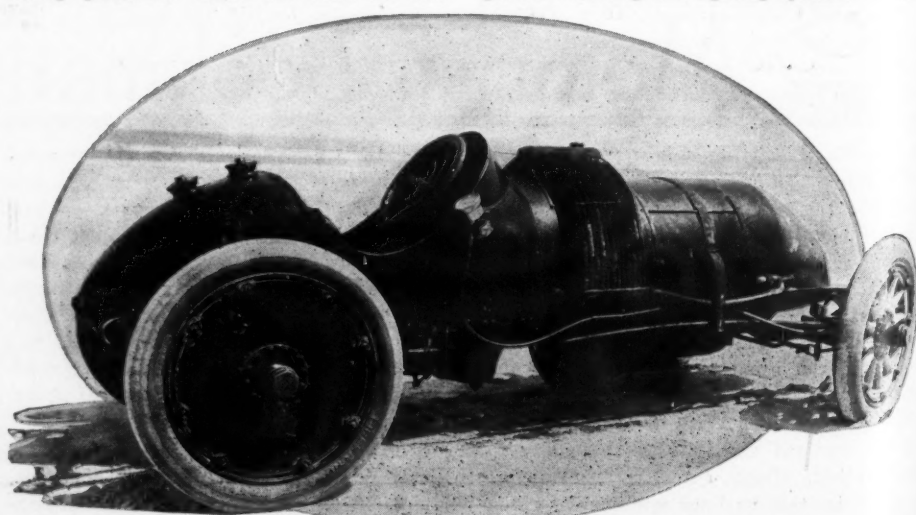


Fig. 2—The Buick Bug once driven by Bob Burman

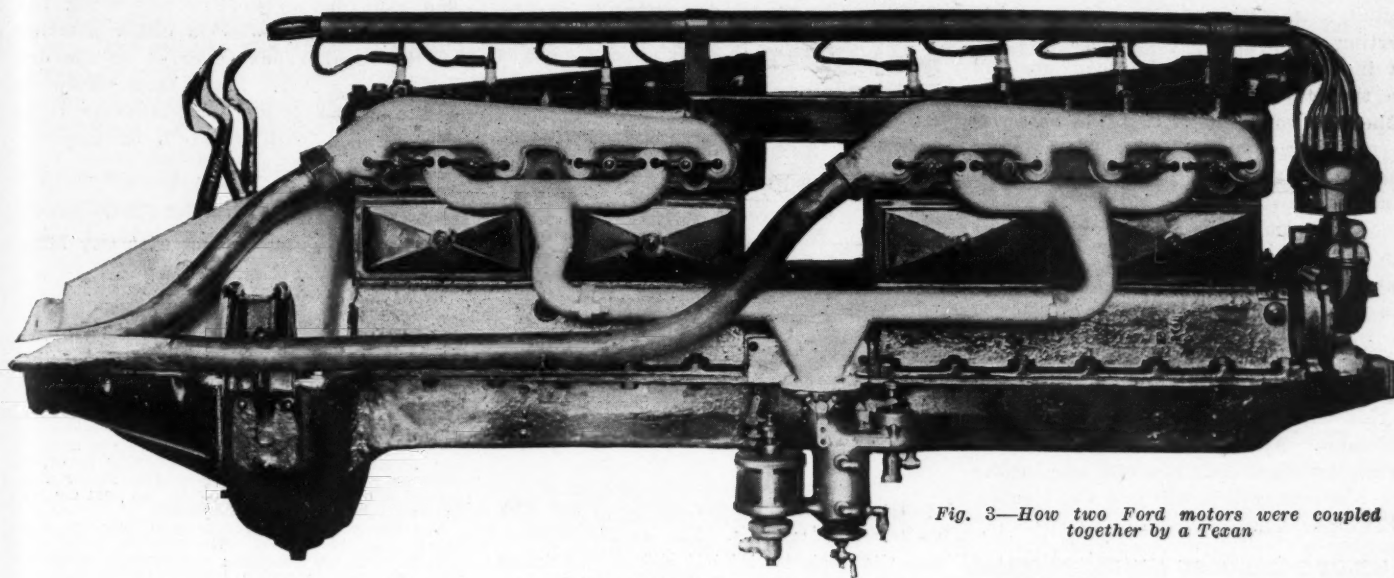


Fig. 3—How two Ford motors were coupled together by a Texan

3—What is meant by answer to question No. 2 relative to Hudson super six crankshaft asked by A. J. Gorsuch in March 9th issue of Motor Age?—H. G. Warren.

1—Yes. Herz & Co., 245 W. 55th St., New York City.

2—Shown in Fig. 2.

3—The answer referred to is "on us." The dashes represent spaces left for dimensions, which we failed to fill out. The diameters of the Hudson super-six crankshaft are: front bearing, $2\frac{1}{8}$ inches, center bearing $2\frac{1}{8}$ inches, rear $3\frac{1}{8}$ inches.

COUPLING FOUR-CYLINDER MOTORS Reader Wants Data on How to Join Two Ford Engines

Plattsburg, Mo.—Editor Motor Age—Kindly explain how to build an eight-cylinder motor by using two Ford motors and how they should be coupled together. How should the cylinders fire?

2—What horsepower would such an engine develop?

3—How can one make the two motors as solid as one?

4—How should the two crankshafts be coupled in order to make them fire correctly?

5—Would the motor run if set and timed as follows: Cylinder number one on motor one fires, then number one on motor number two fires between number one and number two on first motor, etc.?

6—Would a Ford magneto give sufficient electricity to fire both motors?

7—What type of crankcase would be best suited for such a motor?

8—What would be best for the water circulation?—Jack Chalker.

We would refer you to Motor Age of September 16, 1915, on page 24 of which was illustrated and described an eight-cylinder Ford motor made by joining two

Ford engines together. In this the two crankshafts were connected in the center by means of a flange coupling, using the original flange on the front motor shaft and shrinking another on the front end of the rear motor shaft, bolting the two together, as shown in Fig. 3.

The crankcase was made by using the front and rear ends of the Ford crankcase and brazing in steel sides to give it the required length. The intake manifolds are of the original Ford type, the rear one being sawed in two, turned around and the two welded together.

The carburetor is a model 2-C Stromberg, double-jet type. The two exhaust lines run back into a single muffler, designed especially for this motor. Atwater Kent ignition is used, regular Ford type, excepting the distributor head, which was built especially for this motor.

As to your other questions, we would refer you to the people who constructed this motor, Battle & Hubbard, Dallas, Tex. Tex.

PUMP ACTION NOT MOTOR KNOCK High Speed of Oakland Oil-Pump Creates Slight Tapping Sound

Cincinnati, O.—Editor Motor Age—I have an Oakland Six, Model 32-1916, which has a very peculiar knock in it. The knock can be heard at high speeds more so when climbing a long grade on high, also on quick acceleration on low gears. It seems to occur just as

often as a valve tap. It is not the carburetor. The car is new and has only been driven 1,500 miles. It is equipped with a Remy distributor. The distance in the breaker seems to be too far. This knock occurs regardless of the spark position.—L. E. Norris.

It is our opinion that you are confusing the slight noise created by the oil pump with what you consider a motor knock. The oil pump on the Oakland model 32 is driven directly from the camshaft and therefor operates once to every two revolutions of the motor. The rapid operation sometimes creates a slight noise which is often incorrectly interpreted as a motor knock.

PROPER ADJUSTMENT OF AIR VALVE Regulate Valve on Hot Air Tube in Accordance with Temperature

Ulen, Minn.—Editor Motor Age—How may wear or lost motion be taken up in the main driving pinion of the 1915 model H 4, Chevrolet?

2—In the hot air pipe, next to the carburetor there is an adjustable opening for cold air. Would it be advisable to close this cold air port or leave it as it came from the factory? Would it be better to use all hot air?

1—Possibly the ball bearings have become worn and need replacement. You do not give us enough information regarding the place that the lost motion is evident.

2—The adjustment of this opening should be regulated in accordance with the weather conditions and operation of the motor itself. In extremely cold weather it is well to use hot air exclusively. In the warm summer months, when no difficulties in starting are experienced, it would be advisable to open the cold air port to its fullest extent. If, in warm weather, your motor overheated, it would be very likely due to the fact that too much warm air was being fed to the carburetor.

Reader Makes suggestion

Kimball, S. D.—Editor Motor Age—I noticed in the Readers' Clearing House, page 37, May 4 issue, that Subscriber asked for information as to trouble he is having with his 1915 Maxwell.

Subscriber will find there are four dry cells under the front seat that are con-

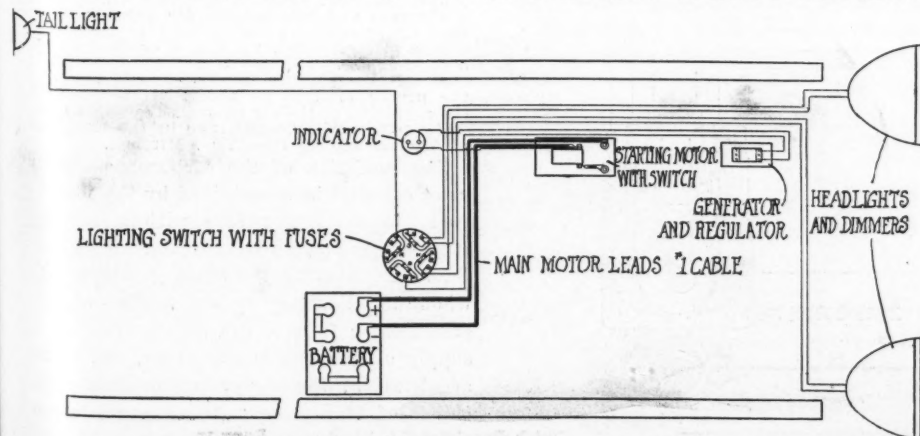


Fig. 4—Gray & Davis wiring diagram on Metz 22

nected to the magneto as boosters when starting the motor. These batteries are set in a metal box. Take them out and see that the paper casing is not water-soaked or worn out so that the batteries do not ground on the metal box. Next look at the starter switch. See that the small copper switch with battery terminals is not loose and grounded. The reason that two or three cylinders always go bad is that these two cylinders fire on the same side in the breaker box and the batteries are wired to this side only.

Also see that the battery wires are not crossed, as there is a positive and negative to this wiring which the Maxwell wiring will show. Attach the black wire to the carbon terminal and the red one to the zinc terminal, which will end the trouble. —E. Gunderson.

TAKE-UP FOR LOOSE STEERING GEAR Warner Gear on Moline-Knight 40 has Two Adjustments

Elizabeth, La.—Editor Motor Age—How is slack taken up on the steering gear of the Moline-Knight 40, 1916 model? Kindly give diagram.—J. Hill, Jr.

Fig. 5 shows the Warner gear used on the Moline-Knight 40. The up and down adjustment is made by turning the nut A at the foot of the column clockwise. In order to turn this nut A, the bracket holding the column to the dash must be loosened as well as the clamp nut on the housing should be backed out to release the strain against A. There is also a take-up at B adjusting the shaft endwise.

SINGLE VS. DOUBLE MUFFLERS ON 8 Questions Ability of One Exhaust to Take Care of Two Cylinder Blocks

Newark, N. J.—Editor Motor Age—Kindly give the approximate cost of applying double exhaust and muffler to a 1916 model 60, Cole 8. Give diagram showing this.

2—Would this improve the running of the car and eliminate the low gear effect of the exhaust when traveling on high gear?

3—Would another muffler, the same size as is now on the car be suitable, or is this too large?

4—Is the flexible tubing running from the exhaust end of the motor to the muffler of the Cadillac 8, the same tubing as is used on the hot-air intake on carburetors?

5—Kindly show the power curve of the Cole 8 if available.

6—Which is faster, the 1916 Buick little or big six and what are the records?—J. C. Scharling.

1—2—3—Upon investigation the makers claim to have found that the large single

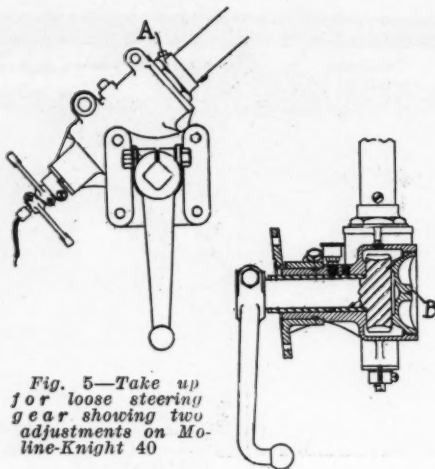


Fig. 5—Take up for loose steering gear showing two adjustments on Moline-Knight 40

muffler was just as efficient in every way as two smaller ones. The double exhaust was thoroughly tried out and it was found that it did not produce any better results at any speed than the large single exhaust.

4—The same type of tubing, of course the size is different.

5—Published in later issue.

6—A stock car D-6-45 was driven at the rate of 72 m.p.h. on the Indianapolis speedway and the D-6-55 will do better than 60 m.p.h. on ordinary roads, according to the factory.

SPARK TROUBLE IN BATTERY BOX Reader Suggests New Remedy for Trouble Described in Previous Issue

Vermilion, S. D.—Editor Motor Age—I note in the May 4th issue of Motor Age that you have made a mistake in regard to spark trouble in a 1916 Maxwell.

You will find the trouble in the dry cell box, as one wire to dry cells will short cylinders 2 and 3 if it comes in contact with the metal box in any way. If you will remove dry cells you will find that one or more of them have worn through the retainer and the zinc is exposed. Put heavy card board in the bottom of the box, install a new set of dry cells and your trouble will be eliminated.—C. C. Pike.

Wiring an Old Franklin

Ponsford, Minn.—Kindly publish a wiring diagram of the 1910 Franklin six-cylinder car.—H. F. Hodder.

See Fig. 6.

Wire May Be Grounded

Uneda, Kan.—Editor Motor Age—In the May 4 issue of Motor Age, page 37, Subscriber, Eli, Nebr., states he is having trouble with the Maxwell magneto in cylinders 2 and 3. I believe Subscriber will

find that his magneto is not weak, but that the battery wire is either shorting on the breaker box cover or on the dry cell battery box. More than likely he will find the former; nevertheless it is the dry cell wire which is causing the trouble.—D. S. Mackey.

IRREVERSIBLE STEERING GEAR Questioner Overlooks Fact that Car Must Follow Ruts

Detroit, Mich.—Editor Motor Age—In reply to Mr. F. M. Tuite in the issue of May 18 on "Irreversible Steering Definition," Motor Age makes the remarkable statement in the last sentence that "few steering gears are completely irreversible as this would make the steering harder."

It would be interesting to know how this is figured, since the nearer one gets to irreversibility, the greater the leverage, and the greater the leverage the easier the steering becomes. This is well demonstrated in the Motor Age issue, September 9, 1915, in an article on driving straight by M. J. Napier.

All kinds of cars, trucks and tractors certainly can be driven with greater ease and safety with an absolute irreversible steering gear, and all deflection from a straight direction to be avoided as far as possible as indicated in the article referred to.—Theo. B. Stanley.

True enough, unless, as is frequently the case, it is necessary to follow ruts.

SEEKS ADDRESSES OF RACE DRIVERS Where Mail of de Palma, Rickenbacher and Oldfield Goes

Mayburg, Pa.—Editor Motor Age—Explain by diagram the valve mechanism on the new Delage motors.

2—What company makes a good tachometer and would it be advisable to install one on a Chalmers 6-40?

3—What are Ralph de Palma's, E. V. Rickenbacher's and Barney Oldfield's addresses?

4—Can Motor Age supply me with an illustration of the Chalmers that won the Uniontown hill climb in 1915, and also of the Buick Bug?—Jas. E. Brown.

1—See Motor Age, May 25, page 14.

2—Veeder Mfg. Co., Hartford, Conn. The instrument is valuable if you care to know the exact speed the motor is running.

3—Ralph de Palma, 35 Fort Washington Ave., New York City; E. V. Rickenbacher, Prest-o-Lite Co., Indianapolis, Ind.; Barney Oldfield, 534 S. Spring St., Los Angeles, Cal.

4—We have no illustration of the Chalmers. A view of the Buick Bug will be found in Fig. 2.

METHOD OF ADJUSTING STROMBERG Symptoms to Look for and Directions for Proper Setting

Marion, Ia.—Editor Motor Age—I have been having trouble in getting the Stromberg carburetor, model G No. 2 on my car to give proper mixture. Will Motor Age kindly give a diagram and instructions for adjustment of this carburetor? I am unable to start the engine without either priming it or flooding the float chamber. If I get it adjusted so that it runs all right during the day, it will not give the proper mixture at night. It seems that the condition of the air controls the adjustment and the very slightest change in the condition of the air affects it.—C. G. Mitchell.

The condition of the carburetor adjustment can first be ascertained by the following: If the motor fires with a sort of rumbling sound, as if laboring, the carburetor is delivering too much gasoline. If, when accelerating quickly, the engine backfires or fails to fire at all, too lean a supply of gasoline is the cause. If, when accelerating, the motor misses and spits clouds of black smoke, the mixture is too rich for idling, or possibly needs heat.

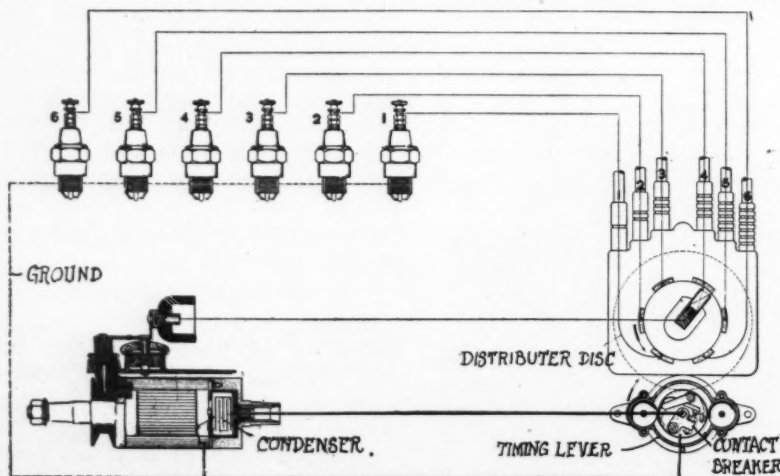


Fig. 6—Wiring diagram of the 1910 Franklin six

The diagram in Fig. 7 shows a cross section of the model G Stromberg carbureter. The gasoline adjustment is set at the factory and never needs attention. In fact there are only two adjustments, the low-speed nut A, and the high-speed nut B. Considering that the carbureter is entirely out of adjustment the procedure is as follows: Set B so there is about $\frac{1}{8}$ of an inch clearance between the spring C and the nut D, above it.

Set the low speed nut A so that the air valve, E is seated very lightly. Start the motor, first closing choker F, and opening it as soon as the motor starts. Let the motor warm up thoroughly, then with spark retarded, adjust A up or down so that motor runs smoothly at low speed. To determine the proper adjustment open the air valve by depressing D slightly. If, when this is done, the motor speeds up it indicates too rich a mixture and A should be turned down, but if, instead, the motor dies it indicates too lean a mixture and the adjustment should be reversed.

Advance the spark and open the throttle gradually. If the motor backfires it indicates too lean a mixture at high speeds and nut B should be turned up until this is overcome. If the motor loads up and spits black smoke, the gasoline supply is insufficient and B should be turned down until the motor operates properly. Turning either nut up means more gas, down, less gas.

CHANGE AFFECTS A SPEEDOMETER

Slight Difference in Mileage Can Be Computed from Simple Formula

Indianapolis, Ind.—Editor Motor Age—In changing the size of tires from 32x3½ to 33x4 on a Dodge car, will there be any variation in the speedometer readings? If so, kindly give the method of figuring and percent of difference. According to tire makers' charts the carrying capacity of 32x3½ tires is 500 and 600, front and rear respectively. This just equals the weight of the car, which is 2,200 lbs.

2—Are the tires overloaded when the car is loaded?—L. T. Brocking.

1—A 32-inch tire revolves 631.7 revolutions per mile, a 33-inch tire, 611.1 revolutions per mile. Your speedometer reading will vary in accordance with the following proportionate equation: $\frac{1}{4}$ being the corrected speedometer reading, and A the mileage shown:

$$\begin{array}{rcl} 611.1 & \times & \\ \hline & = & \\ 631.7 & \times & A \end{array}$$

2—No. Capacity figures apply to the car without load.

HAS TO SPIN THE MOTOR TO START

New Magneto Fitted Is Probably of Wrong Rotation

Tracy, Minn.—Editor Motor Age—Have just recently replaced the old model Splitdorf magneto on my model 29 Buick with a new Dixie Splitdorf. As yet have not been able to start the engine without spinning. If same is properly set should it start on a quarter turn? I am using on this motor a model R Schebler.

2—State the correct way of setting the magneto so that it will give the spark at the proper time.

3—How can one tell whether it is too far in advance or retarded?

4—The motor works well and runs perfectly even without missing, but it is not quite as

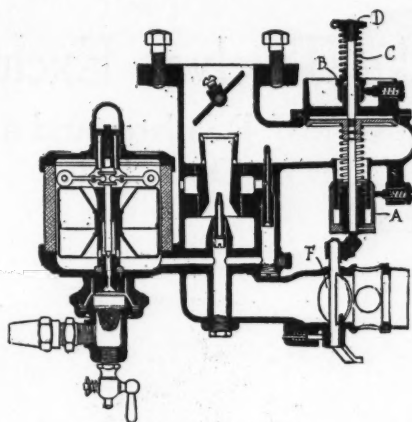


Fig. 7—Showing adjustment of Stromberg carburetor

Inquiries Received and Communications Answered

John L. Becker.....Eckman, N. D.
W. O. Seltz.....Oklahoma City, Okla.
A Subscriber.....Mantanzas, Cuba
H. G. Warren.....Geraldine, Mont.
Jack Chalker.....Plattsburg, Mo.
L. E. Norris.....Cincinnati, O.
A Reader.....Ulen, Minn.
E. Gunderson.....Kimball, S. D.
J. Hill, Jr.....Elizabeth, La.
J. C. Scharling.....Newark, N. J.
C. C. Pike.....Vermillion, S. D.
H. F. Hodder.....Ponsford, Minn.
D. S. Mackey.....Uneda, Kan.
Theo. B. Stanley.....Detroit, Mich.
James E. Brown.....Mayburg, Pa.
C. G. Mitchell.....Marion, Ia.
L. T. Brocking.....Indianapolis, Ind.
L. Hass.....Charlton, Ia.
C. B. Patridge.....Tracy, Minn.
No communications not signed with the inquirer's full name and address will be answered in this department.

quick on picking up or as easy to start as it was formerly on the old magneto, and I do not think it is quite as fast. Should not the installing of this high-tension magneto have increased the power and flexibility of the motor?

5—In meshing a drive pinion against a bevel ring on this car, just how deep should the gear be meshed?

6—The motor has been completely overhauled and worked quietly for the first 100 miles; then it commenced to assume a grinding or humming sound, like a cream separator, increasing in volume as I accelerated the motor. This sound is much more in evidence when the motor is idling than when pulling. When pulling it vibrates through the frame. It is not a harsh grind, but an annoying one. What suggestions can Motor Age offer for a remedy?—C. B. Patridge.

1—It is very probable that a magneto with the wrong rotation has been fitted to your car. The motor should start on a quarter turn. Present the matter to the Splitdorf Magneto Co., Minneapolis, with a view of having the present magneto replaced with one of the correct rotation.

2—The magneto should be set so that the points of number one cylinder will break when the piston is about 1-16 inch beyond and below top dead center, the spark lever being fully retarded.

3—If too far retarded the motor will

labor and heat with spark advanced; if too far advanced the motor will knock with spark fully advanced.

4—Answer to question 1 applies.

5—The gears should be meshed at such a point that there will be minimum noise when the car is pulling and when it is coasting. When the motor is pulling the gears are driven out by the thrust; when coasting they climb in by reverse thrust being applied from the action of the wheels. A means adjustment between the two extremes gives the most quiet gears.

6—You give us no idea where this noise comes from. Possibly the trouble is in incorrectly meshed timing gears.

INQUIRIES ABOUT KNIGHT MOTOR

Heat of Motor Will Not Hinder Action of Slide Valves

Charlton, Ia.—Editor Motor Age—Is it true that the Knight motor will not operate properly in cold weather on account of the oil getting stiff?

2—If a Knight motor gets hot will the sleeves expand so as to hinder the movement and stop the engine?

3—What is the highest engine speed of the following cars: Studebaker Six, Paige Six, Reo Four, Haynes Light Six, Jeffery Four and Six, Mitchell Six of Sixteen?

4—Kindly give the names of five or ten cars selling under \$1,150?

5—Who manufactures the lowest priced car in America?

6—Who manufactures the highest priced car in America?—L. Hass.

1—No.

2—No.

3—Studebaker six, 1,800; Paige six, forty-eight, 2,000; Reo, 1,750; Haynes, 3,200; Jeffery, 1,900; Jeffery six, 2,200; Mitchell Six of Sixteen, 2,000.

4—There are so many cars selling under that mark that we could not give you five or ten without showing discrimination. We would suggest that you write the Commercial Union Assurance Co., Ltd., 55 John street, New York, for a copy of its motor car list, which would give you the desired information.

5—The Gadabout Corp., Detroit, Mich.

6—The Pierce-Arrow Motor Car Co., Cleveland, O., makes the most expensive complete car and the Simplex Automobile Co., New Brunswick, N. J., the most expensive chassis.

Lengthening the Wheelbase

Rich Hill, Mo.—Editor Motor Age—Please tell me if I can lengthen out the drive shaft of a rear axle as indicated by sketch Fig. 8. I want to lengthen the wheelbase about 15 inches using a new frame. If the suggestion is not practical, will I have to get a different axle with longer shaft. The forward end of driveshaft is supported to frame cross member.—M. F. Gench.

It would be entirely possible to lengthen the shaft as you have indicated, only the construction would be merely a makeshift and would not be very desirable.

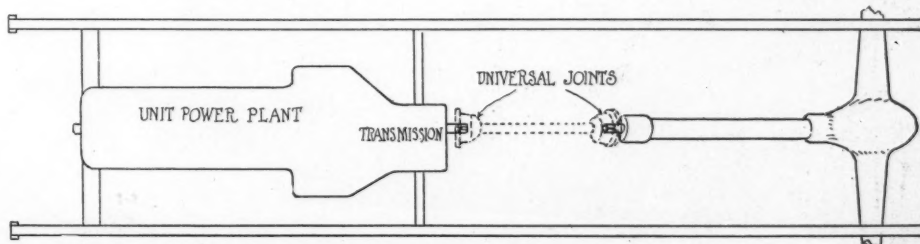


Fig. 8—How reader would lengthen driveshaft to rear axle

Pathfinder Will Make Twelves Exclusively for 1917

Two Models, A Cloverleaf Roadster and a Seven-Passenger Touring Car in Line

PATHFINDER cars for the 1917 season will have twelve-cylinder motors exclusively. The entire chassis has been redesigned to take the new power plant and this model, which is put out in two body forms, touring and cloverleaf, now makes up the entire line of the concern.

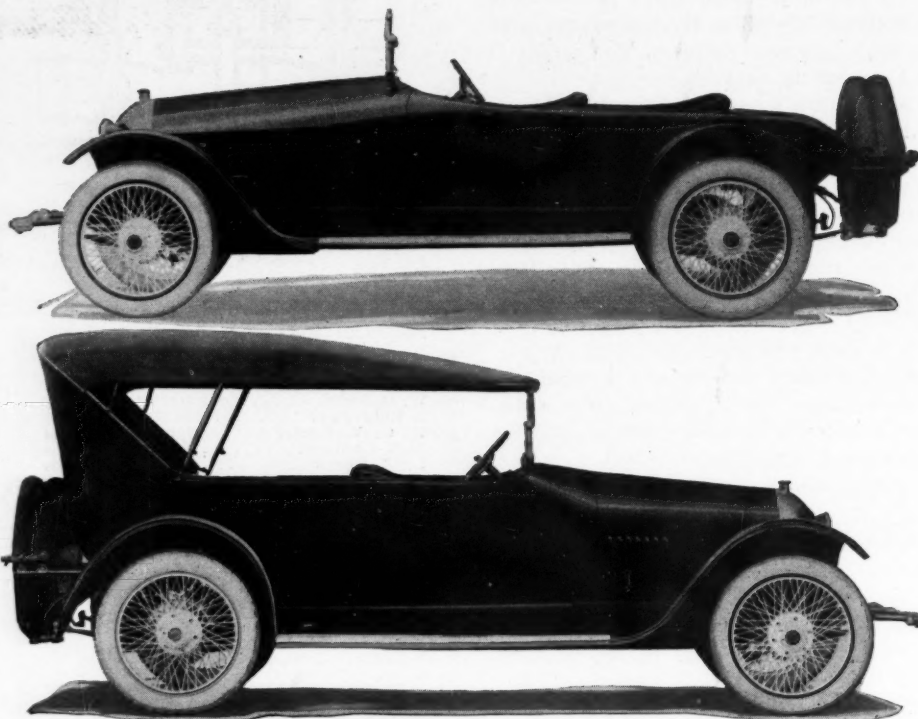
Probably the most distinctive feature of the car is the power plant which is the Weidely two $2\frac{3}{4}$ by 5 inches twelve-cylinder unit. This is also manufactured in Indianapolis, not a very great distance from the Pathfinder factory. It is a V-design with valves in the head, having the two sets of cylinder blocks mounted at an angle of 60 degrees.

Cylinders Cast in Blocks of Three

The cylinders are cast in blocks of three with the head castings, containing the intake manifolds, water outlets and valve seats, in blocks of six. With this arrangement the stiffness of the block casting is secured and at the same time the cylinder castings themselves are more simple. The right set of cylinders is pushed $1\frac{1}{4}$ inches forward of the left to provide for side-by-side connecting rod bearings on the crankshaft.

Cast-iron pistons are used and they are fitted with patent high-compression rings. There is an oil ring at the bottom and a V-groove cut all around the piston which is drilled for oil passage. The connecting rods are elliptical in section. They are drop-forged and the weight is reduced as low as consistent with strength.

A $2\frac{3}{4}$ -inch crankshaft is used. This is carried on three main bearings. It is provided with the curved-cheek counterbalancing system and the oil leads for the pressure system are carried in tubes across the curved cheeks.



Above is shown the new Pathfinder Cloverleaf roadster and below the seven-passenger touring car

A feature of the valve action is in the exceptionally wide faced helical gears. These are so arranged that there is a constant drag on the gears even at idling speeds, thus preventing them from rattling when not under load. The entire valve drive is taken off a single camshaft which is provided with twenty-four cams. These are integral with the shaft which is a drop-forging hardened and ground. The camshaft is placed directly above the crankshaft. The cams set directly upon mushroom followers, the tap-

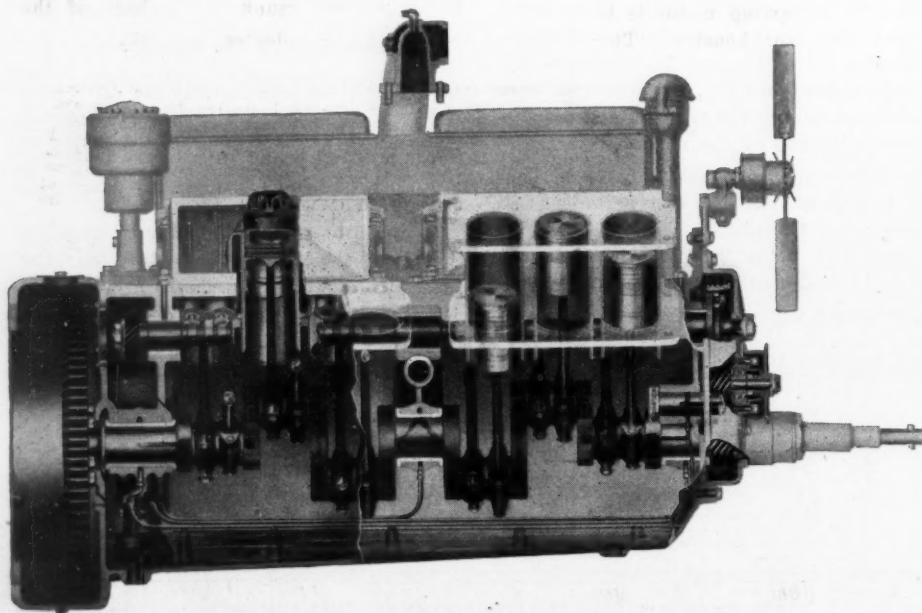
pets passing through long guides and transmitting the drive to the pushrods which extend upwards behind the coverplates to the rocker arms.

The valve diameter is $1\frac{1}{2}$ inches in the clear. The springs are large in diameter and the rocker arms bear directly on caps on the end of the valve stems. The entire valve mechanism is inclosed by aluminum cover plates which extend over the tops of the cylinders inclosing the rocker arm mechanism and also over the sides inclosing the push rods.

In working out the oiling system the lower half of the crankcase forms the oil pan in the usual way. This pan is covered with a strainer so that all droppings from the motor are screened before they enter the space below which contains, at its lowest point, the oil pump. There is also a separate, fine-mesh strainer located on the oil pump suction pipe so that all the circulated oil must pass through two strainers before it is again pumped to the engine.

Lubrication

There are four leads from the oil pump. Three of these go to the main bearings from where the oil enters the drilled crankshaft and is led to the connecting rod bearings by means of the tubes across the curved cheeks of the crankshaft, as described. The fourth lead carries the oil to the camshaft and takes care of the bearings for this shaft as well as the tappets. The overflow from the fourth lead also supplies the timing gears with a



Phantom view of the Weidely Pathfinder motor

copious supply of lubricant. Special provisions are made for maintaining a supply of oil at the rocker arms so that these only need be given a fresh supply at infrequent intervals.

A neat arrangement at the water circulation has been provided for in spite of the natural difficulties presented by the separate castings for valve head and cylinders and also by the overhead valve action. The waterpump is mounted on the generator shaft which is driven off the fourth gear of the timing set. The pump is about the center of the motor on the right side. The water intake is at the lower end of the pump and it is led out through a divided manifold at the top. The water enters the lower part of the cylinder blocks on the right side and is fed directly to the right block jackets.

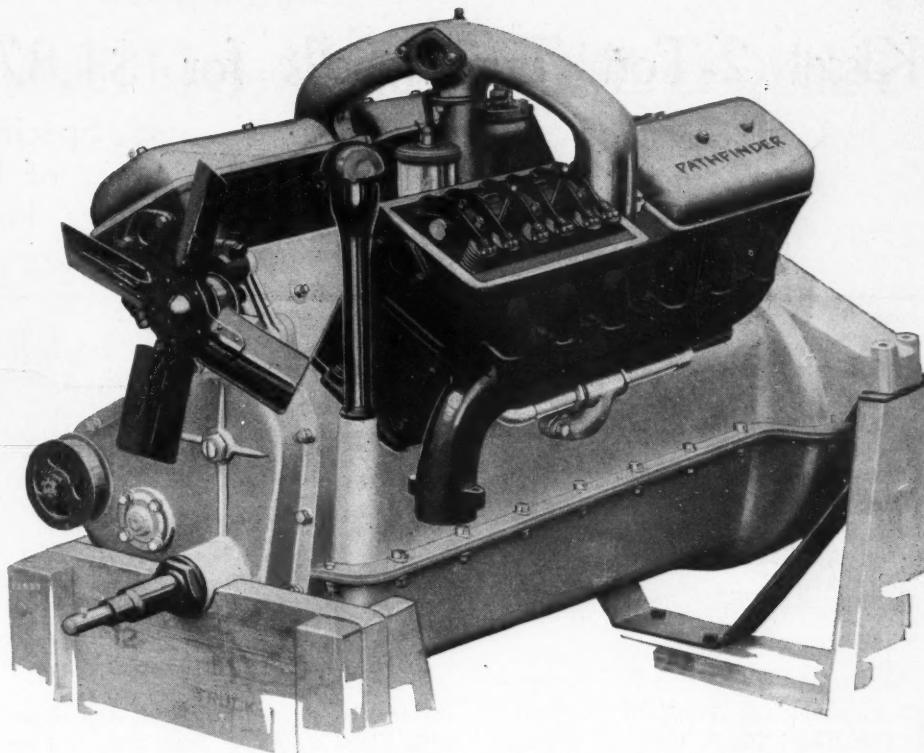
The water for the left block passes through a lead tunnelled through the crankcase and formed by a core in this casting. The aluminum integral tube is lined by a steel tube which is driven through, forming a passage for the water. A Fedders radiator is used cased with German silver. It is supported on an individual cross member which is detachable and so arranged that the supporting members do not put any strain on the radiator itself. It is maintained in an upright position by stay rods. The edges of the radiator are rounded off in a distinctive style and conform to the shape of the Pathfinder hood. The water capacity is close to 12 gallons, the big capacity being obtained by the V-shape and the 4-inch cores.

The Cooling System

In arranging the manifold work on the car the water outlet from the cylinders and the intake pipe have been merged together. This produces the two-fold effect of the water-jacketed intake and a unit casting which carries both the water and the intake gases. The intake is semi-elliptic in shape with the carburetor beneath and the flange for the radiator connection in front. This is a ground surface to allow for a tight gasket.

Carburetion is provided by a specially-arranged type H Stromberg instrument. This is swung in the center between the two cylinder blocks. The effect is perfectly symmetrical and should give exact balance of the gas flow. The exhaust is led to the outside of the head casting and the manifold is swept low to keep the heat away from the occupants of the car. Separate exhaust headers are provided for each cylinder block, leading to separate mufflers so that the back pressure due to exhaust in one cylinder cannot affect the exhaust of another.

Gasoline feed is provided by the Stewart vacuum system. The tank is suspended on the rear of the car and has a capacity of twenty-one gallons. The manufacturers claim that mileages, with this car, of fourteen to the gallon are not exceptional. A detail of interest is that in case of flooding of the carburetor, the space between



Another view of the Pathfinder motor showing valves exposed

the cylinder blocks is arranged as a drain and carries away the gasoline instead of allowing it to accumulate.

Electrically the car is entirely Delco, three unit system for starting, lighting and ignition being used. Initial current is supplied by a 160-ampere-hour storage battery floating on the line. This is supported on the right frame side member. The timer distributor is mounted on the top of the rear end of the crankcase and is driven by a vertical shaft which carries at its lower extremity to oil pump. The drive is taken from the camshaft. There is a centrifugal governor in the base of the timer housing which regulates the spark under normal running conditions.

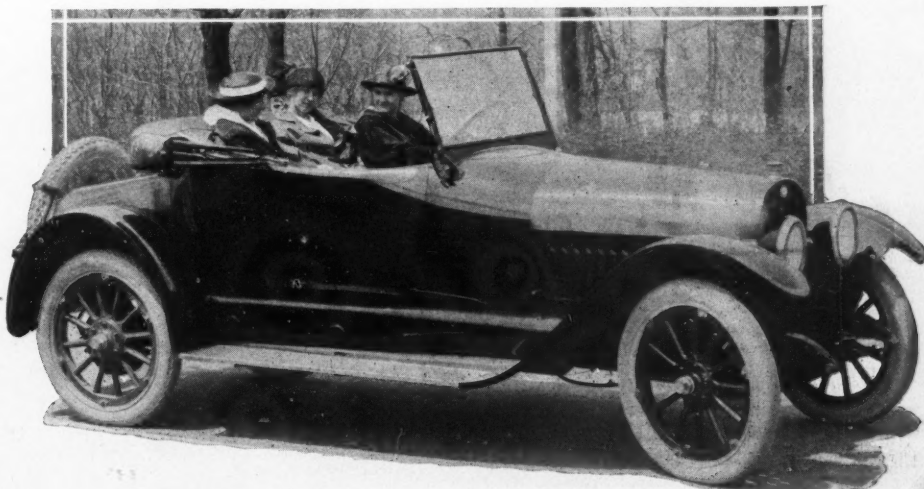
Starting is by the independent series wound Delco unit so wired that the motor is cranked by pressing a button. A feature of the starting motor is the detachable commutator housing. The capacity

of the battery on this car is said by the manufacturers to be such that it is capable under normal conditions of furnishing sufficient current to crank the engine steadily for 25 minutes.

Like the remainder of the electrical equipment the lighting system operates at 6-volts. A feature of this unit which is of Delco manufacture, is the ease of reaching the brush assembly by removing the detachable cover plates. This permits of ready inspection of the brushes and also allows the ordinary owner to keep this part of the generator clean without having to wait until serious trouble makes a trip to the service station necessary.

The headlights have two sets of bulbs for country and city driving. There is a rear tonneau light controlled by a convenient switch and also a cigar lighter which is countersunk in the back of the

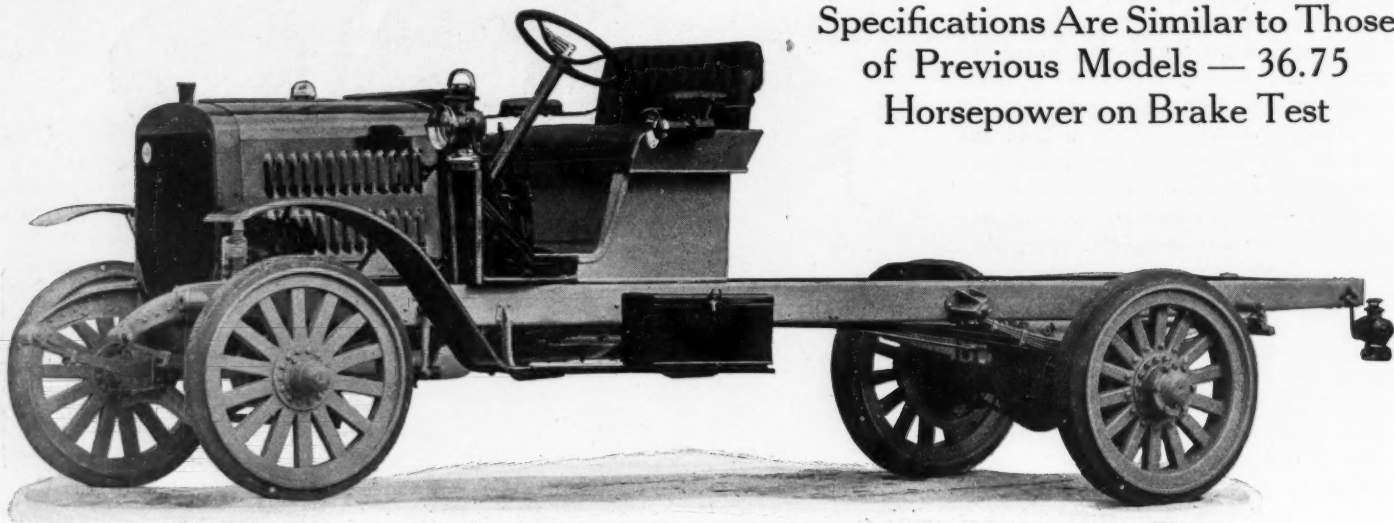
(Concluded on page 43)



Showing how the Mitchell roadster takes care of three passengers

Kissel 2-Ton Truck Sells for \$1,875—Reduced \$235

Specifications Are Similar to Those
of Previous Models — 36.75
Horsepower on Brake Test



Side view of the new Kissel 2-ton truck chassis

IN its new truck, the Kissel Two-Tonner, The Kissel Motor Car Co., Hartford, Wis., announces a price, for chassis alone, of \$1,875, a reduction of \$235 over the present truck of the same capacity. Specifications throughout hold closely to the previous model designs.

The motor, which is built in the Kissel factory, is a four-cylinder, block-cast, $4\frac{1}{4}$ by $5\frac{1}{2}$, developing, according to the factory, a break test horsepower, at 1,200 r. p. m., of 36.75. It is embodied in a unit power plant construction with the gears. The gray iron crankcase casting is divided on a line 2 inches below the crankshaft center, designed to insure great strain resistance. The crankshaft is drop-forged from 40 per cent carbon steel, and is suspended in three bearings constructed of babbit poured into a steel skeleton. The camshaft, also suspended in reinforced babbit bearings, is an integral forging. Wrist pins, $1\frac{1}{8}$ inches diameter, are made of Shelby steel tubing.

The motor is oiled by splash system in combination with a gear pump which forces oil through tubes to troughs under each of the connecting rods. The car-

bureter is manufactured in accordance with Kissel design by Stromberg, and receives fuel from a Stewart-Warner vacuum tank which is attached direct to the motor.

The radiator, of the square-tube type, is hung in a spring-suspended cradle designed to prevent weave and vibration on the radiator when travelling rough roads. Cooling is by centrifugal pump circulation, with a water capacity of 5 gallons.

Maximum speeds are regulated automatically by a governor on the motor, which allows a maximum engine speed of 1,295 revolutions per minute, permitting the truck to travel 14 miles per hour on direct drive, 16 on fourth, 8 on second, and 4 on low. The wheelbase is 144 inches and tire sizes in the standard equipment are 34 by $3\frac{1}{2}$ inches front, 36 by 6 inches rear, solid.

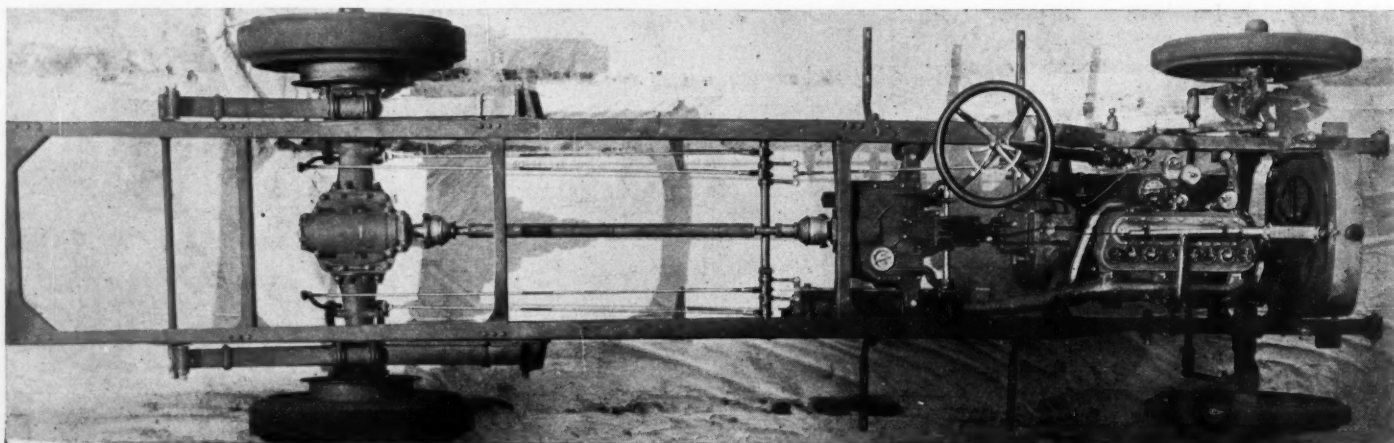
The frame is of pressed steel 6 inches deep, $\frac{1}{4}$ inch gauge, 34 inches wide, suspended on semi-elliptic alloy steel springs measuring 38 inches long by $2\frac{1}{2}$ inches wide on the front and 54 by 3 on the rear.

A standard stake body, painted Kissel blue with black chassis is furnished for \$150 additional, or special bodies with in-

creased wheelbase or length of frame upon specifications. The factory has on file drawings and prices for special bodies of every description which may be secured upon application. A 6-volt electric starter motor driven from the flywheel by a Bendix screw with a 6-volt lighting generator driven by gears from the engine complete with storage battery and electric lights is offered at \$150 additional.

"SHINE YOUR COLLAR, MISTER?"

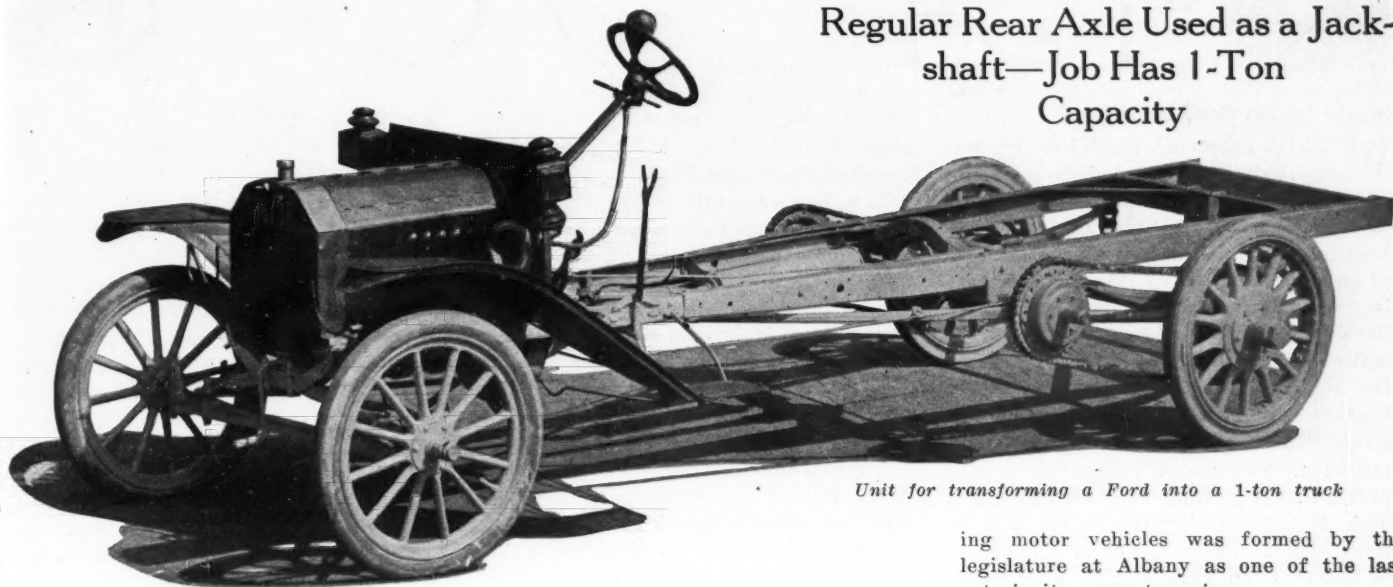
Mr. Motorist may soon be greeted by the son of sunny Italy after the manner set forth by the head of this paragraph, for, be it known that E. I. du Pont de Nemours & Co., has brought out a collar for motorists, a cleanable collar that is said to look exactly like any ordinary linen collar. They come in the same styles and colors, but the surface is treated to make them cleanable with a sponge or damp cloth. Thus if Mr. Motorist finds that his collar is soiled and he does not wish to clean it himself, he can visit the first shoe shining parlor and get his collar sponged off at the same time he gets a polish on his brogans. What next?



Top view of the Kissel 2-ton truck, showing layout of motor, etc.

Truck Unit for Fords Has Unique Spring Design

Regular Rear Axle Used as a Jackshaft—Job Has 1-Ton Capacity



Unit for transforming a Ford into a 1-ton truck

THE Automobile Mfg. & Engineering Co., Detroit, Mich., has entered the field of manufacturers of truck units for Ford cars and offers an outfit which follows closely the scheme of attachment and drive that has been worked out in a number of instances. The auxiliary truck frame is arranged to slip over the regular Ford frame, and when in position the Ford rear axle becomes the jackshaft, driving sprockets being attached to the axle shafts in place of the regular Ford wheels. It is said to be a very easy matter to attach the unit and requires the drilling of only a few holes in the regular Ford frame in order to bolt the front end of the truck frame in place. Suspension of the truck frame from the auxiliary truck axle is by three-point platform construction, so arranged that the rear cross spring acts as an auxiliary when carrying a light load up to 500 pounds. For loads above that amount the weight is transferred to the side springs.

The truck unit gives the Ford a rated capacity of 2,000 pounds, although it is said to be capable of a 50 per cent overload. The wheelbase is 135 inches and the rear wheels measure 32 by 4 inches, being fitted with Firestone solid tires. The service brakes are on the rear wheel drums and are controlled by rods running forward, while the emergency brakes act upon the jackshaft. Substantial radius rods maintain proper alignment between driving sprockets and wheels, and the frame is substantially reinforced by diagonal cross pieces to assist the cross members. The unit is priced at \$350, and where the Ford chassis is also furnished the total cost is \$750.

PLANS ELEVATED SPEEDWAY SYSTEM

Chicago, May 26—The feasibility of building motor driveways above the level of the streets in Chicago, similar to the elevated railway systems, was brought to

the attention of the American Institute of Architects at a meeting held yesterday at the Art Institute of Chicago. Elmer C. Jensen, chairman of the Lincoln highway committee of the architects' organization, explained the plan. No crossings would exist along the thoroughfares so constructed. Concrete structures of artistic design would be erected on the main traveled routes to each outlying district of the city.

TO REVISE NEW YORK TAX

New York, May 26—A special committee to revise present methods of tax-

ing motor vehicles was formed by the legislature at Albany as one of the last acts in its present session.

The present system is based on horsepower for passenger cars with but one charge for motor trucks. It has been stated that the committee should devise a means of truck taxation that would be based on weight, on the assumption that they are destructive to roads and in proportion to their weight. It is recognized, however, that this is largely a matter of tire width, and the committee is cognizant of the injustice of taxing broad-tired motor trucks by weight while horse vehicles, whose narrow tires impose much greater abrasive stresses on the pavement, go untaxed and unrestricted as to tire width.

Pathfinder to Make Twelves Exclusively for 1917

(Continued from page 41)

front seats and which is accessible to those in both the front and rear. The headlights are mounted on extra rigid brackets and all the wiring is inclosed in flexible conduits.

Asbestos against steel is used in the dry plate clutch. There are six asbestos faced disks which form the driving member. These act against hardened and ground steel plates which form the driven member. There is one stiff coil spring holding the clutch in engagement. No lubrication is used on the clutch.

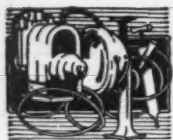
A unit power plant is formed by the gearbox, clutch and motor. The bell housing is an S. A. E. type and the plant is supported at three points with a trunnion carrier in front. Timken bearings are used throughout the entire transmission. The gears are held in mesh at any speed by a gear interlock which locks the sector not in use.

The drive is taken to the rear axle through a universal joint and propeller shaft. The rear axle is a floating American type, with 1¼-inch axle shafts of chrome nickel steel. The central housing is a malleable casting and the external

ends of the housing are made up of 3½ per cent nickel steel tubing. The driving gears are spiral bevel and made from nickel steel carried on Bock taper roller bearings.

Vanadium steel springs are employed with three-quarter elliptics in the rear. The front springs are 39 inches long and 2¼ inches wide. The rear are the same width and 54 inches long. Bronze bushings are used. The drive is taken through the front ends of the springs which are shackled only at the rear.

Both body models, the LaSalle seven-passenger and the Cloverleaf roadster are mounted on the same 130-inch wheelbase chassis. The front seats on the touring car are divided and the auxiliary seats fold into the backs of the front seats. Touring cars are furnished as standard in blue black, wine and dark green with white wire wheels. Cloverleaf roadsters are furnished in red, yellow, battleship grey and blue black with red wheels. The wheels are Houk wire and the prices are \$2,750 for the touring car and \$2,900 for the cloverleaf. The tire size is 35 by 5 and equipment is complete in every particular.



The Accessory Corner



Signal for the Car Behind

WITH the automatic Signalite supplanting the tail light and license bracket of a car, the direction which the driver is to turn is conveyed to the traffic which follows by an automatic switching on and off of an electric indicator. Turning the steering wheel, applying the brakes or throwing into reverse, flashes a signal on the dial showing whether the car will turn to the right or left, will slow down, stop, back to the right or back to the left. On straight driving the Signalite acts as a tail light. The device is useful either day or night. If a hand-lever attachment is desired for operating the signal to show right or left turning it will be supplied in addition to the automatic device. Illumination is given from the standard tail light bulb, operated from the lighting battery. If the car has no lighting system, five dry-cells will give the necessary current.

Roche Headlight Regulator

With the Roche headlight regulator it is only necessary to turn a button attached to the steering post to secure any adjustment from bright to real dim lights. It is a product of the Roche Electric Machine Co., Grand Rapids, Mich. The device is designed to meet the various lighting needs which cannot be obtained by the ordinary two adjustments of bright and dim. When attached to Ford cars, it is said to maintain a fixed maximum of current to the lights, thereby eliminating the danger of burning out the bulbs when racing the motor. The regulator is put out in three sizes, for cars using 6-8

volt system, for cars using 12-15 volt system, and for Fords, each selling for \$5.

Gasoline Gauge for Fords

The Badger Craft Shops, Sheboygan, Wis., have brought out a gasoline gauge to be used in place of the tank filler cap in Ford cars. The indicator is graduated in gallons in etched letters of such size that they are easily legible, even at night, according to the makers. The apparatus consists of a hollow brass float which is fitted to a spiral upright that turns the indicator on the dial as the gasoline supply is raised. The gauge is protected by a 1/8-inch disc of plate glass. To install, it is only necessary to put this gauge in place of the standard filler cap. No machine work is required. The list price is \$1.25.

Howe Searchlight

The Howe Mfg. Co., Chicago, introduces a searchlight which is mounted on a universal bracket embodying coil springs designed to provide a constant tension on the joints and thus, while allowing the lamp to be moved readily, insuring its always remaining fixed in the position in which it is placed. The wiring is protected by the hollow bracket. The list price is \$7.50, or with rear-view mirror of polished plate glass attached, as shown in the illustration, \$9.

Post Type Evenlight

The St. Louis Electrical Works, St. Louis, Mo., builds a device, known as the post type evenlite, for Ford cars, designed to give the headlights a constant brilliancy regardless of speed. It is stated that, at 7 miles an hour, it gives five times the standard Ford light; 10 miles, three

times the standard; 15 miles, twice the standard; and at 20 miles and over it is constant regardless of engine speed. The post type requires less than 20 minutes to install and is supplied with two lamp clamps and screws with all necessary wiring, listing at \$6.

Speedometer Shaft Repair

The Speedometer Repair Co., 1303 West Jackson boulevard, Chicago, has a process of repairing flexible speedometer shafts that is said to be the only one known. No solder is used, as this destroys the flexibility of the shaft, but a crimped steel ferule is attached in such a way that it holds the broken ends together and yet gives the shaft the same flexibility as before being broken.

Gasoline Assistant

The Economizer Supply Co., Winnipeg, Man., is placing on the market a gasoline assistant, or gas economizer. The company guarantees that this compound contains no acid nor any other ingredient that will injure any part of the motor. They claim a mileage increase of from 20 to 40 per cent. At the same time, the use of the compound is said to remove all carbon from pistons, valves and spark plugs. One quart treats 150 gallons of gasoline.

Howell Self-Service Pump

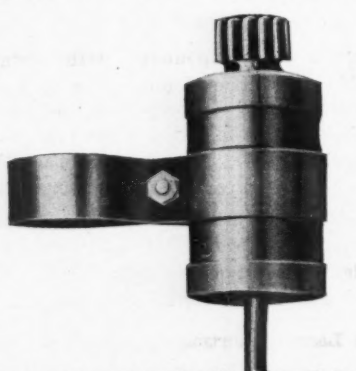
Howell Pump & Tank Co., Owensboro, Ky., market a curb pump designed to handle the sale of gasoline automatically without any attention whatever on the part of the garagemen except to keep it filled and to change the vending mechanism as the price of gasoline varies. The advantage of this pump is that it enables the motorist to purchase 25 cents', 50 cents' or \$1.00 worth of gasoline by simply dropping in coins to this amount. The mechanism is so devised that when the tank is empty, the coin slots are automatically closed.

Wausau Abrasives

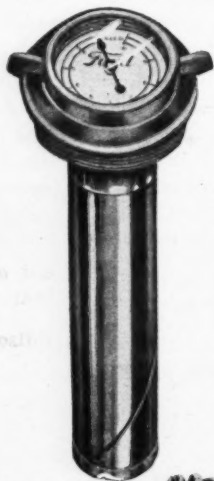
Flint paper, emery paper, garnet paper and wausite are made in various degrees of fineness to suit different work, by the Wausau Abrasives Co., Wausau, Wis. A handy product is the Wausau waste-proof strip which consists of a 50-yard ribbon of emery cloth wound on a spool so that it may be placed conveniently above the bench. Pieces are torn off just as needed and consequently waste is avoided. It is made in all emery grades and in all widths.

Leathertex Clutch Facing

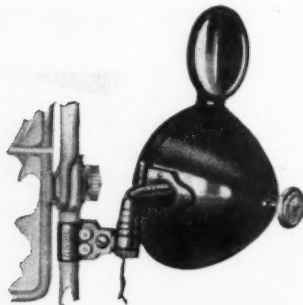
Designed to give greater durability and efficiency, Leathertex cone clutch facings are a combination of specially tanned leather and textile, the two being merged into one under 3,000 pounds hydraulic pressure. The manufacturer is the Hide,



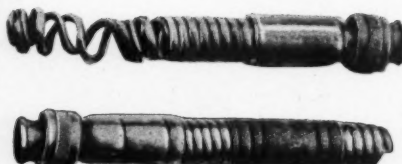
The Roche headlight regulator



Howe searchlight and bracket



Signalite device for rear of car



Speedometer shaft before and after repairing

Leather & Belting Co., Indianapolis. The outer surface is leather and the inner surface fabric. A smooth, velvety action and unlimited wear are claimed. The company has had more than 50 years' experience in the manufacture of leather goods and guarantees that the facings will hold their shape and will not vary in thickness more than 1/100 of an inch.

Ratchet Wrench for Small Nuts

The unique ratchet wrench recently brought out by W. B. Lane, 180 North Dearborn street, Chicago, consists of a set of ten pieces, a ratchet handle, two screw driver blades, and seven socket wrenches designed for close work on small nuts. It fits three standards of nuts, U. S. S., A. L. A. M., and cap screws in range of sizes embracing about nine-tenths of all nuts used about a car. The entire tool is machine made, the sockets being turned from steel bars, cold-broached and case-hardened. The ratchet may be reversed by shifting the wire on the handle from one side of the lug to the other. The ratchet wrench is said to be very strong and free from complications. The price of the complete equipment in a heavy leather case, is \$2.50, extension bar 7 inches long, 50 cents extra. Another and larger set with six socket wrenches to fit all nuts and bolt heads on Ford cars is being marketed, complete with leather case, at \$3.

Apco Spring-Leaf Lubricator

The Auto Parts Co., Providence, R. I., maker of Apco specialties, is marketing a spring-leaf lubricator adaptable to cars other than the Ford. The device was formerly packed one set of eight plates for the Ford, but owing to the demand for a lubricator, the company is packing them one pair to a box so that any owner can buy as many as desired. The lubricators are made in two sizes, the larger being 2 inches between bolts and the smaller size 1½ inch. These lubricators are adaptable to all types of springs and with semi-elliptic springs eight sets constitute a complete equipment. The device consists of a pair of semi-steel plates with felt inserts and oil reservoirs. The felts rest against the sides of the springs, feeding the lubricant by capillary attraction. They can be attached in 2 minutes with a screw driver, retail at 30 cents the set, and come tapped to take any ⅛-inch oil cup. The finish is black enamel.

Standard Chemical Specialties

A wide list of chemical products are produced for motor car needs by the Standard Chemical Co., Minneapolis. Lubrigas is a heat resisting lubricant which is designed to remove carbon, increase speed and power. It is added to the gasoline. Pints, 40 cents; quarts, 75 cents; gallons, \$2.50. Wayside hand cleanser is a liquid cleaner which may be used without water. One-quarter-pint can, 10 cents. Auto top cleaner is a naphtha-emulsion combining both the wet and dry principles

of cleaning. It removes dirt and grease spots readily, it is said. Pint, 35 cents; quart, 50 cents. Other products include a waterproof dressing, tire flating compound, radiator cement, powdered carborundum, metal polish, silver polish, hand paste soap, valve grinding compound, air floated mica tire powder, tire talc, varnish cleaner, enamel dressing, solvo cream, flash polish for all metals, cushion dressing, rim paint, automobile soap, Vul-tex tube patching outfit, engine enamel, creme polish and black enamel. A combination case containing an assortment of these products has a retail value of \$52.95. Another combination case is priced at \$98.45.

Stevens Air Cleaner

The Stevens automatic blow-cock and cleaner, sold by Stevens & Co., New York, is designed for dusting the cars, cleaning motors, removing chips from bench and machine tools, etc., wherever compressed air is available. It is provided with a convenient operating handle and the valve has a tapered metal seat. It is listed at 75 cents.

Bench for Garages

A work bench designed especially for use in private and public garages is manufactured by Motor Engineering Co., Cleveland, O. It is light in weight, the legs being built of tubing, yet strong enough to withstand hard use. Each leg has a cast-base provided with bolt holes for fastening the

bench to the floor. Complete with a steel vise, the price is \$11.75.

Standard Radius Rod

The Standard Auto Accessory Co., Leipsic, O., handles the radius rod which bears the name of the company. These radius rods are designed to reinforce the regular Ford rods and are installed in the same position except that they catch below the front axle instead of above it. The price is \$1.50.

Power Winch for Many Purposes

A new type of winch designed as an all-purpose equipment to pull cars out of bad roads, to load freight on heavy trucks, or as a helper in moving heavy equipment to the side of the motor car, has been designed by Henry H. Smith, Monterey, Cal. The device attaches to a cross-shaft in front of the radiator and is driven through a worm direct from the end of the motor crankshaft. The front end of the worm-shaft runs on a bearing, and the rear end of the worm gear works against the chassis cross frame through a ballbearing, taking the thrust. Back-pressure of the load holds the wormshaft in engagement with the crankshaft. When not working the wormshaft is shifted forward out of connection, or by removal of two set screws, may be taken out and stored in tool box. By removal of five bolts the whole apparatus may be taken off and carried in the car.

Spee-Dee Hand Cleaner

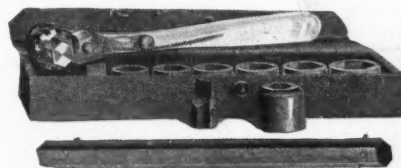
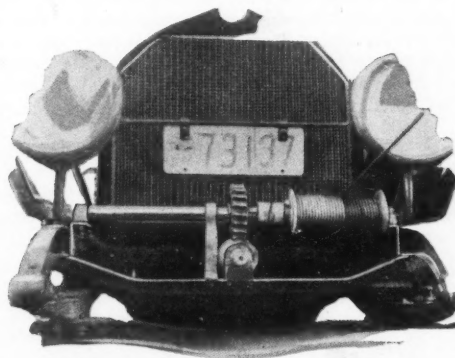
State Chemical Co., Chicago, markets this cleaner. No water is required with this compound, which is a solvent for grease and which, it is said, will readily remove all dirt from the hands. It does not injure the skin. It may be mixed with water and used to clean only oily motor parts. Spee-Dee costs 5 cents per can.

Sexton's Castor Motor Oil

Castor oil is compounded with certain vegetable and mineral oils so as to form a lubricant, which, according to the manufacturer, the Sexton Oil Co., Chicago, possesses the desirable qualities of pure castor oil without its drawbacks. The lubricant is made suitable for any service by varying the proportions of the different oils. The price is about the same as that of the highest grade mineral oil.

Edison Lamp Assortment

Edison Lamp Works of the General Electric Co., Harrison, N. J., is introducing among dealers a display box of assorted sizes of Edison mazda lamps to aid them in their sales work. The assortment is the minimum stock which any dealer should carry and will enable him to meet the lamp requirements of 90 per cent of all the gasoline and electric cars for 1914, 1915 and 1916. The lamps are arranged in an attractive container and a list of the lamps carried is printed on its cover.



Above—Power winch for many uses
Below—Ratchet wrench for small nuts



A repair bench for garages



From the Four Winds



CLOTHING STORE ON WHEELS—If you live in the big city you can call on your clothing dealer and have him, if you so wish it, send several selections on approval. But if you live anywhere within driving distance of Bangor, Me., you can call Fred P. Ray and he will bring his whole stock to your door. For 6 years Mr. Ray has been catering to high-class trade in his territory, but always has been handicapped by the available means of transportation in his territory until a motor truck representative solved the problem. The above photograph shows Mr. Ray's outfit mounted on a Chase Model A chassis and it will be noticed the body is fitted with drawers of various sizes. The drawers are fitted with rollers so that they can be moved in and out with ease. The truck contains twenty-two drawers, the size of each being carefully worked out for the particular goods carried, such as clothing, shoes, etc. After the goods have been shown the drawers are pushed into the body, the doors closed up and locked with Yale locks.

OFFERS New Haynes for Old—The Haynes Automobile Co., Kokomo, Ind., will give a new Haynes twelve in even exchange for the oldest Haynes car that can be found.

Dodge Popular in Oregon—Figures just issued by M. O. Wilkins, motor car statistician for Oregon, show that the Dodge was the most popular car in April in Multnomah county. Thirty-seven Dodges were sold. The next in popularity was the Overland of which thirty-four were sold.

Akron Truck Load Limit—Service Director Beck is taking steps to limit the load to be hauled over the streets of Akron, O., on motor trucks. He claims that excessively heavy loads are doing great damage to the streets. He is of the opinion that 5 tons should be the maximum load permitted.

Pennsylvania Registrations Show Gain—Revenue from motor registration this year in Pennsylvania has passed the \$1,700,000 mark and officials of the motor vehicle division of the Pennsylvania state highway department are of the belief that the \$2,000,000 mark will be reached. The total revenue for 1915 amounted to \$1,665,276. The number of registrations up to date are 161,564. It is believed that the total number will reach 250,000.

Car Thefts Prevalent in Texas—Notwithstanding the law passed by the last Texas legislature, making it a penitentiary offense to steal or joy ride in a motor car, 211 cars were stolen in Dallas during the fiscal year ended May 1, according to the annual report of the Dallas police. Of this number 196 were recovered. Several arrests were

made and sentences imposed. Already during May three men have been sent to the penitentiary for motor thefts and another was given a 6-months' term on the county road for joy riding.

Politics Figure in Accident Punishment—The number of deaths caused in Philadelphia since January 1 by carelessly driven motor cars has resulted in indignant protests from many sources, and resolutions favoring immediate action by business associations there. So far this year nearly fifty persons have been killed, mostly due to speeding. Politics is believed to play an important part

in the delay of the police department taking concerted action, as it has refused to give an official list and accounting of the deaths until after election on May 16.

K. C. Cops Get Motors—The Kansas City, Mo., police department has revived its motor car squad, which will work chiefly for the recovery of stolen cars and the apprehension of the thieves.

Must Have Mirrors on All Cars—William L. Dill, motor vehicle commissioner of New Jersey, has issued an order to the effect that the provisions of the law with respect to motor cars carrying mirrors for rear view will be strictly enforced. Heretofore it has only been demanded of trucks, but now all cars must be so equipped.

Ninety-One-Year-Old Chauffeur—Shippensburg, Pa., challenges the world to produce an older chauffeur than "Daddy" Stutenroth, who passed his ninety-first birthday anniversary last Christmas and drove the Gas & Electric Company's new Ford truck last week. For more than 40 years Mr. Stutenroth has been in the employ of the gas company at Shippensburg and is always on the job, in the ditch or in the office, just as his services are required.

Snow in Snoqualmie Pass—Motorists planning trips to the coast in the near future must postpone their arrangements indefinitely, according to word received from the Spokane Good Roads Association. Five to 6 feet of snow in Snoqualmie Pass has delayed the opening of this popular roadway and the opening date will depend on weather conditions.

Coming Motor Events

CONVENTIONS

June 12-16—S. A. E. annual cruise, Lake Huron and Georgia Bay.

TRACTOR DEMONSTRATIONS

July 17-21—Dallas Tex.
July 24-28—Hutchinson, Kan.
July 31-Aug. 4—St. Louis, Mo.
Aug. 7-11—Fremont, Neb.
Aug. 14-18—Cedar Rapids, Ia.
Aug. 21-25—Bloomington, Ill.
Aug. 28-Sept. 1—Indianapolis, Ind.
Sept. 4-8—Madison, Wis.

Clubs and Associations

Pennsylvania Club's Membership Campaign—So far the campaign of the Automobile Club of Delaware county, Pennsylvania, has resulted in an increase on membership by 140, bringing the total membership up to 1,690.

Portland Dealers' Association Elects—At the weekly meeting of the Portland Automobile Dealers' Association, R. S. Hurd, manager of the Portland branch of the White Co., was chosen president. H. M. Covey, first vice-president; Frank R. Riggs, second vice-president; Henry L. Mann, treasurer, and M. O. Wilkins, secretary.

Harrisburg Club Plans Tour—Members of the Harrisburg Motor Club, Harrisburg, Pa., are planning for a scenic tour to Johnstown June 17 to 19. This event will take place of the annual run of the club and, although 3 days will be taken for the trip, only two—Saturday and Monday—will be spent on the road. On Sunday the motorists will make a tour of Johnstown. About 160 miles will be covered each way.

Bonds for Rockford Club—The officers of the Rockford Motor Club, Rockford, Ill., have launched a campaign to dispose of \$10,000 worth of bonds to finance the proposed new club house to be erected on the banks of the Rock river. The foundation of the structure has been laid but it is desired to have the money on hand before undertaking further construction. The membership of the club has increased to 500 so that no difficulty is expected in disposing of the paper.

Portland Club Drafts Plans—The complete list of officers and the committee who will be responsible for the affairs of the Portland Automobile Club, Portland, Ore., during the coming year, has just been announced by President Overmire. The number of committees has been narrowed down to six, which will carry all the responsibilities of the club. The organization has broadened itself along many lines and is now working on an extensive bulletin system which will do much to extend the propaganda of better roads and also to help members make use of the club's road information service.

Ohio Association to Merge—The Columbus Automobile Trade Association, Columbus, Ohio, an organization of dealers, at a recent meeting voted to amalgamate with the Columbus Garage Owners' Association and to affiliate with the Ohio Automobile Trade Association by paying the per capita tax and automatically to affiliate with the national organization. The Columbus Automobile Trade Association is an incorporation with capital stock, shares being valued at \$10 each. The members of the garage owners' association will buy shares of stock in the other association and the charge of the latter concern will be given up.

Club Studies Traffic Conditions—The Automobile Club of Kansas City, Mo., is taking a leading part in the study of traffic conditions in the city, and the working out of new traffic regulations. F. F. Rozelle, president of the club, is an attorney, formerly counsel for the county court, and of long experience in legislative matters. Edwin Camack, an at-

torney, is chairman of the legislative committee, and is giving particular attention to the subject of traffic rules. The subject of traffic and similar legislation that would affect car owners, was discussed at a recent meeting of the club, following the presentation of the plans of work of the Federation to Protect Life and Property. It was apparent that from outside sources there was likely to arise agitation that might discredit motor car owners; the Federation invited the Automobile Club to participate in every step that it might take towards traffic regulation.

Buffalo Club Elects—Mason B. Hatch, the Buffalo distributor of the Chalmers, has been elected president of the Buffalo Automobile Dealers' Association. The other officers elected are as follows: Vice-president, O. E. Oliver; treasurer, Charles K. Kane; secretary, John J. Gibson. The directors of the association are J. A. Cramer, Charles F. Monroe and Howard B. Smith.

Topeka, Kan., Club Elects—The Topeka Automobile Association, Topeka, Kan., has elected the following officers: President, H. S. Putney; vice-president, Curt Myers; secretary, Frank Southwick; treasurer, George W. Stansfield. The association will try to cause a change in the character of the paving between the tracks of the street railway on Kansas avenue, from cobblestones to some smoother material. The association will soon select a camping site for tourists, in or near the city, and will erect markers pointing to the site.

Kentucky Club Organized—The Kentucky Automobile Country Club is being organized by prominent Louisville car owners, the object of which is to establish and maintain a country club for Kentucky motorists. At a meeting of the incorporators held in the Inter-Southern building, the following officers were elected to serve the company for the first year: President, George L. Martin; first vice-president, Charles J. Cronan; second vice-president, Albert L. Terstegge; secretary, Joseph J. Kimmell; treasurer, Kentucky Title Savings Bank & Trust Co.

Tractor Organization Formed—Advancement of the science of engineering is the purpose of an association of tractor manufacturers in Minneapolis, Minn., and also in design, manufacture and use of tractors. Officers are: President, G. T. Strite, Strite Tractor Co.; vice-president, W. J. McVicker, McVicker Engineering Co.; secretary-treasurer, Robert Gaylord, Gray Tractor Co. Directors, 1 year, Harry Buffington, Minneapolis Steel and Machinery Co.; Messrs. McVicker and Gaylord; 2 years, G. C. Andrews, Andrews Tractor Co., and O. B. Kinnard, Kinnard-Haines Co.

Good Roads Activities

Dixie Highway Headquarters Moved—Headquarters of the Dixie Highway Association have been moved to the Hotel Patten, Chattanooga, Tenn.

Kansas Road Association Formed—The McPherson County Automobile Association, McPherson, Kan., was organized recently, chiefly to boost for good roads, and to help towards their planning and building. Officers are: President, B. B. Bassore; vice-president, John Ostlund; secretary, Milton Hawkinson; treasurer, D. F. Kuns. Regular meetings will be held four times a year.

Biglow Pathfinding with Cactus Kate—Chas. H. Biglow, first pathfinder for the National Old Trails route from New York to Los Angeles, pioneer of the Los Angeles-to-Phoenix route and the first man to explore Death Valley by motor, recently passed through San Bernardino, Cal., in Cactus Kate, the famous desert Packard, to pathfind the Arrowhead Trail, a new short route cut between Salt Lake City and Los Angeles, which covers part of the old Mormon Trail.

Road Oiling Contracts Awarded—Contracts for more than 1,000,000 gallons of dust-laying oil to be used on the highways of Pennsylvania this year have been awarded by the state highway department. For the purpose of economical distribution the state was divided into four districts. The Headley Good Roads Co., Philadelphia, was awarded the contracts for districts No. 1 and 2. In the first district the amount required is 663,596 gallons and in the second district 262,591 gallons. In district No. 3, where 4,390 gallons are required, the contract was awarded to the Good Roads Co., Baltimore. In district No. 4, where 83,007 gallons are required, the contract was awarded to the Atlantic Refining Co., Philadelphia.

To Improve Wisconsin Road—After a fight lasting 5 years, Waukesha county, Wisconsin, has finally awarded contracts for the improvement of the Blue Mound road 5 miles, from the end of the concrete highway in Milwaukee county to the city of Waukesha, the key to the big Waukesha county lake and resort region which was rapidly losing prestige because of the poor condition of the highways leading to it. The improvement will cost \$40,000. Work will begin June 1 and finish August 20. Blue Mound road is the principal thoroughfare leading westward from Milwaukee. It is said that Waukesha merchants were responsible for holding up the improvement because of a fear that a good road to Milwaukee might divert Waukesha's trade to the metropolis.

K. C. Club Boosts Roads—The present administration of the Kansas City Automobile club has adopted a policy of activity with respect to road matters, and the present prospect is that much will be accomplished towards the improvement of the roads of the county, and the streets of the city. J. Frank Martin, manager of the Buick branch at Kansas City, is chairman of the good roads committee, and has prepared a careful outline of work that should be done, which will be systematically prosecuted by himself and the committee. The club has more than 1,000 members.



A combined irrigating ditch and road in Taos county, N. M. The ditch is the road over a pass and vehicles drive several miles through the water



Among the Makers and Dealers



Packard trucks loaded on barges for shipment to the Atlantic coast, where they will be sent to the war sections of Europe

FOX with Paige Dealer—C. S. Fox, formerly director of service for the old Lozier Motor Co., has formed a connection with the Wetmore-Quinn Co., Detroit, Mich., distributors for Paige-Detroit and Saxon cars.

Curren Goes to Regal—Edward J. Curren, formerly assistant sales manager of the King Motor Co., Detroit, Mich., and also of the Paige-Detroit Motor Car Co., has joined the sales promotion division of the Regal Motor Car Co.

Moorehouse Redden Sales Manager—Jay E. Moorehouse, who was special sales representative of the Maxwell Motor Co., and formerly general sales manager of the H. A. L. Co., Cleveland, has been appointed sales manager of the Redden Motor Truck Co., with headquarters at Detroit, Mich.

McCutcheon with Ross & Young—C. G. McCutcheon, formerly president of the American Gear & Mfg. Co., Jackson, Mich., has been elected president of the Ross & Young Machine Co. Mr. Ross, who has been identified with the motor car industry for the last 12 years, will devote his efforts to the furtherance of the business of the Ross Automobile Co.

Athletic Association for Jeffery—The Thomas B. Jeffery Co., Kenosha, Wis., has encouraged its 3,000 employees to organize an athletic association and begin the construction of a \$4,000 baseball field. The company will bear a generous share of the expense of the project. The new park will be 500 feet square. The grand stand will accommodate 720 persons, with bleachers seating 300 each flanking it on either side. The stands will be built in sections like modern bookcases, so it will be possible to add new sections from time to time without altering the outward appearance of them.

March Succeeds Reeke in M. A. D.—Alton J. March, Curtis Automobile Co., Milwaukee, Wis., has succeeded Alfred Reeke as president of the Milwaukee Automobile Dealers, Inc. Mr. March was elected vice-president at the last annual meeting and is promoted

to the presidency following the resignation of Mr. Reeke, who has moved to Kenosha, Wis., to become general sales manager of the Thomas B. Jeffery Co.

O-So-Ezy Standard Equipment—Recent additions to the list of manufacturers who supply O-So-Ezy Cedar Oil Polish as standard equipment of all new cars include the Interstate Motor Co., Muncie, Ind.; Briscoe Motor Corp., Jackson, Mich.; Detroit Motor Car Co., Detroit, Mich.; King Motor Car Co., Detroit, Mich.; Abbott-Detroit Co., Detroit, Mich.; Empire Automobile Co., Indianapolis, Ind.; H. A. Lozier Co., Cleveland, O., and Haynes Automobile Co., Kokomo, Ind.

Standard Tube Hours Shortened—The Standard Steel Tube Co., Toledo, O., has reduced its working hours to 8 per day, and has raised the wages of its 400 employees 20 percent over what they were receiving, this action taking effect May 12. During the summer months the men will work 45 hours per week, and beginning September 1, and continuing through the fall and winter months, the total week's work will consist of 48 hours.

Maxwell Employees to Get Bonus—Employees of the Maxwell Motor Co., Detroit, Mich., are to become beneficiaries of the company in a profit-sharing system which is to take the form of a substantial bonus at the end of the year. Directors of the Maxwell company at a recent meeting gave approval to a resolution providing for inauguration of the bonus system at the end of the year. Details of the plan have not yet been announced, but it is understood the payments will be in the form of a specified amount to each employee.

Grant Motor Plans—When the Grant Motor Co. Corp. removes its plant from Findlay, O. to Cleveland, which will not be until later in the year, the plant there will be utilized probably as a place where certain parts will be manufactured, in all probability the Grant engine. It is rumored in Findlay that the company will manufacture a truck for light deliveries, and organize a new company for

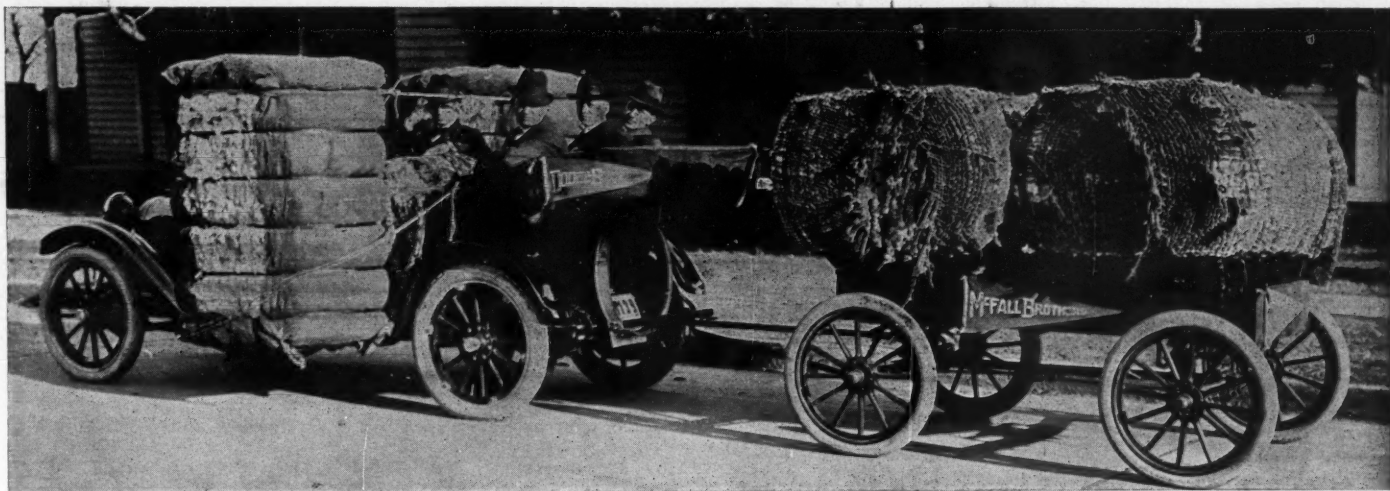
its manufacture. In any event, Findlay people have been assured that as many, if not more people, will be employed at the plant there than now, after the passenger car business is moved to Cleveland.

Frost to Westcott—Allen H. Frost has resigned as factory manager of the Detroit Wire Spring Co., Detroit, Mich., to become service manager of the Westcott Motor Car Co., Richmond, Ind. This corporation will move to Springfield, O., next month.

Schuster Joins Dodge—George H. Schuster, who won the New York to Paris race with the Thomas some years ago, and who was with the Pierce Arrow factory, has gone to Boston to take charge of the Dodge Bros. service station there and at Worcester. He will be supervisor of the stations in eastern Massachusetts.

Bankrupt Company's Affairs to End—The affairs of the bankrupt Milwaukee Motor Co., Milwaukee, Wis., are expected to be wound up and close at the meeting of creditors to be held May 19. At this time the proposition of E. G. Miller and Elise K. John to settle claims made against them by creditors for \$60,000 in cash will be discussed. The claim of the Imperial Automobile Co., Jackson, Mich., has already been settled, and it is expected that the offer to other creditors, being about 75 percent of the claims, will be accepted.

Studebaker Sales Run High—Although the Studebaker Corp. established a new production record for the first quarter of this year, it is said that the present 3 months are certain to surpass by far the previous period from the standpoint of production and sale of cars. Sales of Studebaker cars for the first quarter ended March 31, were 16,953 machines, as compared with 9,400 for the same period the previous year, an increase of 75 percent, and this will be greatly outdone this quarter. The completion of the new \$1,000,000 factory extensions will be a considerable factor in enabling the Studebaker concern to increase its output for the present quarter, and the easing up of the



DODGE CAR CARRYING 3,398 POUNDS—As a demonstration of the utility of Dodge Bros. motor cars, McFall Bros., dealers at Wichita Falls, Tex., in the heart of the cotton country, recently staged a unique parade. A trailer loaded with two bales of cotton

was attached to a Dodge car and a bale of cotton was placed on each running board of the car. Then four men got in and the streets of the Texas town were traversed. The total weight of the cotton and the passengers and the trailer was 3,398 pounds.

freight situation is expected to make it possible to ship all the cars that can be built.

Radiator Builder Making Addition—The National Can Co., manufacturer of radiators, is to erect a three-story building, as an addition to its main plant, at Detroit, Mich.

Vacuum Oil Buys Land—The Vacuum Oil Co. has purchased over 600 acres of ground at Lincoln Park, N. J., opposite Philadelphia, on which it will build an oil refining plant estimated to cost \$3,000,000.

Overland Has Shorter Day—The 20 per cent increase in wages and the 8-hour day schedule at the plant of the Willys-Overland Co., Toledo, O., became effective May 11. Nearly 18,000 factory employes are affected and \$25,000 is added to the weekly payroll.

C. A. Mattison Is Promoted—C. A. Mattison, Detroit, Mich., former sales manager of the Detroit Engineering Products Co., manufacturer of Paramount interrupters and other devices, is now general manager of the company, having assumed his new duties May 1.

8-Hour Day for Garford—Eight hundred employes of the Garford Manufacturing Co., Elyria, O., went on an 8-hour day schedule May 11, instead of the previous 10-hour schedule. It is announced that time and a quarter will be paid for the ninth hour, time and a half for the tenth hour and double time over the former regular day's schedule. Employes working on piece work will receive a raise equivalent to 7½ per cent.

Shipping Motor Cars via Barge Line—A barge line will shortly begin operations on the Columbia river, which will transport motor cars up and down the river from Portland, Ore., at rates of about half those of the steamship lines. The steamers running between Portland and Astoria, at the mouth of the river now charge 50 cents per 100 pounds, which is considered a holdup by the motoring public. The barge will carry the machines for half that price.

Morgan & Wright Adding—Morgan & Wright, subsidiary of the United States Rubber Co. and large manufacturers of tires, has taken a step looking to the concentration of the tire-making operations of the concern at Detroit, Mich., by the acquisition of a block of land on Jefferson avenue with a frontage of 500 feet and depth of 400 feet. This adjoins the present large factories of Morgan & Wright and was bought from the Michigan Steel Boat Co., whose factory buildings now occupy the site. The purchase price is not known, but real estate men here state that it has a value of \$350,000. The

tire manufacturing concern does not take possession of the property until January, 1917, by which time the boat manufacturer will have completed another plant.

Alliance Superintendent Made a Director—W. H. Christensen, superintendent for the Alliance Rubber Co., Alliance, O., has been elected to the board of directors to fill the vacancy caused by the death of the late George C. Russell, who died March 30, in California. J. C. Shively succeeds Mr. Rus-

sell as president. Milton Bejach is vice president and general manager. The statement submitted to the directors and stockholders as of April 1, shows 1,500 per cent increase in business over the corresponding period of 1915. Tires and inner tubes are

WHITE TRUCK CARRIES TREE—The practicability of motor trucks in solving difficult hauling problems for country estates, nurseries, orchards, etc., has led to a wider use of trucks among nurserymen, and it may not be long before the country gentleman can engage the service of his motor truck to arrange the forestry of his estate to suit his own ideas instead of taking it as nature gave it. Estate owners who have large trees they wished removed or those who have fine specimens they might like transplanted to better locations, will be particularly interested in the success of Stedman Bent, Philadelphia, Pa. Mr. Bent used a 5-ton White truck to carry the excellent specimen of oak, shown in the accompanying photograph, from a nursery near Chesnut Hills, Pa., to the estate of Eugene Du Pont at Greenville, Del., a distance of 49 miles over bad roads. The tree was 40 feet high and 13 inches in diameter. It was lifted with a ball of earth encasing its roots, weighing approximately 8,470 pounds. The estimated weight of the tree and rigging was 2,000 pounds, giving the truck a total load of 10,470 pounds. It was lifted and loaded on to the platform of the truck by a block and tackle, without injury.



the chief lines of manufacture, although some mechanical goods are being made also.

Young Goes to Allen—Thomas L. Young, formerly connected with the advertising department of the Willys-Overland Co., has been appointed assistant advertising manager of the Allen Motor Car Co., Fostoria, O.

Von Hambach with Shakespeare—Ernest Von Hambach, formerly with the Sunderman Safety Carburetor Corp., Newburg, N. Y., now is in charge of the Engineering department of the William Shakespeare Co., manufacturer of carburetors.

Rumely Tractor Reversible—The Advance-Rumely Co., Laporte, Ind., will enter its small tractor this summer in eight tractor demonstrations in different parts of the country. One noteworthy feature of the machine is that it is reversible and can be run backward or forward with equal facility by simply turning the seat around.

Remy Laboratory at Detroit—The Remy Electric Co. has recently established in Detroit, Mich., a completely equipped laboratory where facilities are afforded by a complete experimental machine shop, chemical and electrical testing laboratories, together with the sales headquarters, all located at East Grand boulevard.

Continental Motor Plans Expansion—With a view to future expansion, the Continental Motor Co., Muskegon, Mich., has increased its real estate holdings there by buying a 7-acre tract on the lake front, which land is at present occupied by a lumber and fuel firm. This new land will give Continental plenty of room to spread out for some years to come.

Hupp Joins Emerson Motor—R. C. Hupp, who organized the original Hupp Motor Car Co., and later left it to head the R-C-H Corp., and after the latter's failure organized the Monarch Motor Car Co., has become identified with the Emerson Motor Co., a Delaware corporation which proposes to manufacture a five-passenger car to sell at about \$395. This concern will be located in the east.

Springfield Body at Detroit—The Springfield Body Corp., at present located at Springfield, Mass., and manufacturer of convertible bodies, is soon to have a factory at Detroit, Mich. Last week a 29-acre tract of land was secured on Michigan avenue in the Springwells district of Detroit, and convenient to railroad lines. A modern fireproof factory is to be begun immediately, although details of the structure are not yet available.

New Company at Muskegon—The L. O. Gordon Mfg. Co. has been organized at Muskegon, Mich., by J. V. Whitbeck, chief engineer of the Chandler Motor Car Co., Cleveland; C. A. Carey, purchasing agent of the same company; and L. O. Gordon, formerly engineer for the Muskegon Motor Specialties Co. The new concern intends to make camshafts and other motor specialties,

and will employ a force of 100. The city of Muskegon is to erect a \$10,000 plant, 46 by 177 feet, for the new concern and it is expected that deliveries will start September 1.

Fisk Grants 8-hour Day—The employees of the Fisk Rubber Co., Chicopee Falls, Mass., have been granted an 8-hour day with 5 hours on Saturday. Time and a half will be given for overtime work. This comes as a result of a strike, started in March. The strikers will meet in the near future to decide on the company's proposition.

Double Shift for Moreland—The double shift system recently inaugurated at the Moreland Motor Truck Co., Los Angeles, Cal., of this city in the machine and service departments is proving a great success and the system is soon to be adopted throughout the entire factory.

Somerville Republic Advertising Manager—W. A. Somerville, who for some years was advertising manager of the Rapid Motor Truck Co., Pontiac, Mich., and who later held a like position with the Stromberg Motor Devices Co., Chicago, has been appointed advertising manager of the Republic Motor Truck Co.

U. S. Aviators Visit Studebaker—Ten members of the U. S. aviation corps, stationed at Pensacola, Fla., are spending 2 weeks at the Studebaker factories in Detroit, their time being occupied in studying at close range the principles of the gasoline engine. Of these experts, two are officers and eight are privates.

Maxwell Plant in Texas?—G. Newby, representing the Maxwell Motor Car Co., Detroit, Mich., is in Dallas negotiating for the purchase of property on which to locate a plant costing \$200,000. It is known that Hart Bros., representing the Maxwell company in that section of Texas, have been made the offer of a site with all the necessary advantages. The proposed site will cost \$20,000, the limit specified by the Maxwell company.

Monroe Motor Buys Land—In line with its proposed expansion, the Monroe Motor Co., at present located in Flint, Mich., which soon will move to Pontiac, Mich., and occupy the factory buildings formerly used by the old Welch company, has purchased a plot of land having a 596 foot frontage on Saginaw street, adjoining the former Welch plant property. This purchase will enable the Monroe company to put in side tracks to its property from the D. G. H. & M. tracks, and will provide for any later additions to the plant.

Federal Rubber in Wisconsin—The Federal Rubber Co. of Chicopee Falls, Mass., has filed articles and a statement to do business in Wisconsin. Of the \$10,000,000 capital, \$2,000,000 is represented by Wisconsin holdings, consisting of the property of the Federal Rubber Mfg. Co., Milwaukee, which recently disposed of its business to the Fisk interests, as noted at the time. The Wisconsin corporation will be dissolved and lose its identity. As has already been stated, the main plant at Cudahy, Milwaukee county,

will be nearly doubled in size during this year. B. H. Pratt is general manager.

Detroit Electric at Milwaukee—The Anderson Electric Car Co., Detroit, Mich., has filed articles and a statement to do business in Wisconsin. A factory branch recently was established at Milwaukee.

Radiator Company Adding—The Perflex Radiator Co., Racine, Wis., a large manufacturer of radiators for motor cars, trucks and tractors, is preparing to build a plant of its own. Plans have been prepared for the first unit, to be 65 by 250 feet, one story high, of fireproof construction, to be ready during midsummer. The company has been occupying leased quarters for several years, but these have been outgrown. G. W. Bartlett is president.

Overland Service Station in Wisconsin—It is stated on excellent authority that the Willys-Overland Co., Toledo, O., is negotiating for a site at LaCrosse, Wis., for a proposed warehouse and distributing depot to serve territory in the northwest not reached by either the Milwaukee and the Minneapolis-St. Paul distributors. The new branch is to handle twenty-seven counties in southern Minnesota, northwestern Iowa and western Wisconsin.

New Continental Truck Factory—The Continental Motor Truck Co., Superior, Wis., which engaged in the manufacture of motor trucks more than a year ago, is preparing to spend \$50,000 in the erection of a factory of its own. The moving spirit in the company is Dr. John G. Barnsdale, who designed the car, which has been manufactured on a small scale. Under the enlarged facilities, the truck will be built in four sizes and a large production attained.

Reo Buys Real Estate—As an indication of the buildings and extension activities which the Reo Motor Car Co. has in contemplation, additional property has been acquired along the Grand Trunk railroad tracks adjacent to the Reo concern's main plants at Lansing, Mich. The track is 7 acres in extent, and will provide room for greatly enlarged facilities, although no announcement as to what disposition will be made of the new property has yet been given out. This is the second large block of land that Reo has acquired within the last few months there.

Labor Situation Relieved at Milwaukee—Developments in the labor situation in Milwaukee, Wis., with particular reference to the machinists' trade, would indicate that employers have forestalled the anticipated organized demand for an 8-hour day at the present wage, and motor truck and passenger car builders will not long face a threatened outbreak, such as eastern employers have been experiencing. Thirty-five of the largest employers of machinists have petitioned the state industrial commission to make an impartial investigation to determine if the working hours in Milwaukee shops are as favorable as those prevailing in the majority of the shops of their competitors in the middle west.

Akron, O.—Akron Tire Repair School Co.; capital stock \$10,000; to conduct a school to teach tire repairing; incorporators, C. B. Keener, Walter G. Kirkbride, F. M. Williams, W. R. Peppers and Ivo J. Flory.

Bloomington, Ill.—Lexington Garage Co.; capital stock \$15,000; incorporators, J. W. Ashbrand, H. E. Payne, Carrie Ashebrand, Elmo Franklin, Ida D. Adams, C. L. Ashebrand.

Cincinnati, O.—Corcoran Manufacturing Co.; capital stock \$10,000; to manufacture motor car supplies; incorporators, Frank E. Wood, W. Catherine Smith, Charles Sawyer, S. A. Headley, and Rose Schook.

Cincinnati, O.—Corcoran Tire & Rubber Co.; capital stock \$5,000; to deal in tires; incorporators, Thomas J. Corcoran, Jacob A. Hollander, Charles E. Weber, Phil W. Tozzer, T. M. Silber.

Cleveland, O.—The Kerosene Carburetor Co.; capital stock \$150,000; to manufacture carburetors; incorporators, M. D. Faunce, W. W. Myers, H. Federman, Walter H. Wendorff, Florence Sturtevant.

Cleveland, O.—Dann Products Co.; capital stock \$600,000; to manufacture accessories; incorporators, George B. Harris, Joseph

Recent Incorporations

J. Klein, M. A. Close, S. M. Davis, N. C. Beckerman.

Cleveland, O.—Cleveland Yellow Taxicab Co.; capital stock \$10,000; to do a taxicab business; incorporators, George W. Ritter, Bernice Swisher, Ethel Halliday, Myrtle Hotchkiss, and John B. McMahon.

Columbus, O.—The Ohio Puncture Plugger Sales Co.; capital stock \$25,000; to manufacture tire repair articles; incorporators, C. C. Cooke, Earl Browne, H. R. Shaffer, W. R. Aldrich, and A. W. Raymond.

Detroit, Mich.—American Motors Tire Co.; capital stock \$300,000; incorporators, N. W. McLeod, J. L. Johnston, William Grayson.

Findlay, O.—Varley Manufacturing Co.; capital stock \$20,000; to manufacture parts; incorporators, Edwin H. Crofoot, Fred Oswald, Cornelius O. Crofoot, Frank O. Paine, Fred B. Love.

Grand Rapids, Mich.—United Motors Co.; capital stock \$1,000.

Indianapolis, Ind.—Coffin Motor Co.; capital stock \$10,000; incorporators Albert Coffin, William Harrison, Jr., and Raymond Brown.

Oldtown, O.—Oldtown Rubber Co.; capital stock \$30,000; to manufacture rubber articles; incorporators, David Shearman, Leroy M. Bickett, Gertrude P. Bickett, D. Agnes Bickett, and Pearl Means.

Toledo, O.—Toledo Storage Battery Co.; capital stock \$10,000; to manufacture storage batteries; incorporators, Fred A. Tefft, Herman Wiener, Paul T. Gaynor, Blanche O'Brien and Sarah Garvin.

Utica, N. Y.—Utica Taxi and Auto Co.; garage, motors, motor cars, etc.; capital stock \$25,000; incorporators, A. H. Batsford, G. H. Swancott, R. H. Batsford.